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# **Smoking and Health Bulletin**



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Donald R. Shopland  
Technical Information Officer

Technical Information Center  
Office on Smoking and Health  
Park Building, Room 116  
5600 Fishers Lane  
Rockville, Maryland 20857  
Phone: 301-443-1690



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## AGRICULTURE

**81-0327.** Chen, S. Y.; Gupton, C. L. **Three Cycles of Phenotypic Recurrent Selection for High Yield and Low Alkaloid Content in Burley Tobacco.** *Bulletin of the Taiwan Tobacco Research Institute* 10: 1-14, June 1979.

For determination of the efficacy of phenotypic recurrent selection in Burley tobacco (*Nicotiana tabacum* L.) an eight parent synthetic population was composed. From this base population, three cycles of selection for high yield and low total alkaloid content were completed at one location and evaluated at three locations. Correlated responses of characters associated with the selected characters were also measured. A linear increase of 136 kg/hectare (ha) of cured leaves/cycle was estimated. The increase in yield was accompanied by a linear decrease in alkaloid content at the rate of 0.09 percent/cycle. Associated selection responses for plant height, number of leaves, days to flower, grade index, and crop index showed a significant and linear increase from the base population to the cycle three population. A linear decrease in percent alkaloids at the rate of 0.10 percent/cycle was estimated. It was accompanied by a linear increase of cured leaf yield at the rate of 50 kg/ha/cycle. A concurrent increase in leaf size also was significant. Associated selection response for other characters was less consistent compared to that of selection for high yield. The realized genetic correlation between yield and percent alkaloids was -0.56. The mean genetic variability for yield and percent alkaloids did not decline significantly following three cycles of selection. Predicted genetic progress for yield and alkaloids in the fourth cycle was high. Realized heritability ranged from 30 to 50 percent for yield and from 10 to 30 percent for alkaloids. The results from phenotypic recurrent selection demonstrated that selection with phenotypic assortative mating can be expected to effectively increase the availability of the variance in a bulk heterogeneous population. (Auth. Abs.)

**81-0328.** Congleton, W. F.; Collins, W. K.; Hawks, S. N., Jr. **Effects of Transplanting Date on the Yield, Grade Index, and Sugar and Total Alkaloid Concentrations of Flue-Cured Tobacco.** *Tobacco International* 182(24): 62-63, November 28, 1980.

Six experiments were conducted in 1976 and four in 1977 at a total of 10 on-farm flue-cured tobacco production sites in order to determine the effect of transplanting date on yield, grade index, sugar, and total alkaloid concentrations of two varieties, Coker 347 and Speight G-28. Tobacco transplanted 31-54 days later than normal had a significantly lower yield, grade index, and sugar concentration than tobacco transplanted at the normal time. The mean yield decreased from 2,490 to 2,029 kg/hectare, grade index from 36.3 to 21.9, and sugar from 11.1 to 7.5 percent. Total alkaloid concentration was not affected by transplanting date. (Auth. Abs. Mod.)

**81-0329.** Kang, J. Y.; Lee, Y. D.; Heu, I. **Iptambae Alkaloid Saengsonge Kwanhan You'gu Jellbo: Chilsobirysujun kwa Alkaloid Saengsongnyang Kwaul Kwan'gye.** [Studies on the Alkaloid Synthesis in Tobacco Plant. I. Relation Between the Level of Nitrogen Fertilizer and Alkaloid Synthesis.] *Tobacco Research* 1: 17-23, 1977, Korean.

Experiments were carried out to study the effect of different levels of nitrogen on the amount of alkaloid in flue-cured tobacco. Seven levels of nitrogen (N), 0, 6, 9, 12, 15, 18, and 21 kg of N/10 acres were used with constant amounts of phosphorus and potassium. A 25 percent increase in the amount of nitrogen applied (from 12 kg N/10 acres to 15 kg N/10 acres) had no effect on tobacco yield and quality. The alkaloids in tobacco plants were synthesized chiefly after 45 days from transplanting, and 60 to 70 days after transplanting about 70-80 percent of the total alkaloids were synthesized. (Auth. Abs. Mod.)

**81-0330.** Lamarre, M. **L'Influence du Stade et du Mode d'Application de Certains Drageonnicides sur la Composition Chimique du Tabac a Cigarette.** [The Effect of Time and Method of Application of Certain Sucker Control Agents on the Chemical Composition of Cigarette Tobacco.] *Lighter* 50(2): 23-25, Spring 1980, French.

The composition of dry tobacco leaves from plants treated with seven different commercial sucker control agents over a 4-year period was analyzed. The average chemical composition of tobacco was not significantly affected by the mode of application (i.e., machine or manually). In contrast, time of application, whether before or after plant topping, had an important effect on the chemical composition of tobacco. Each year the average contents of nicotine, total alkaloids, and total nitrogen were higher and the contents of reducing sugars lower, when treatment was applied before topping than after it. The average nicotine content was 2.65 percent before topping compared to 2.38 percent after it.



treatments which consisted of timing of application, concentration, and dosages were assigned at random to the subplots. No significant differences in plant height, length and width of leaf, yield, unit price, and total value of cured leaves per hectare were observed among these eight combined treatments. However, compared with the untreated check, a 16 percent increase in stem weight, an 18 percent increase in root weight, a 16 percent increase in yield, and a 20 percent increase in total value were found in the 2,4,5-T treated plants. Nicotine content in cured leaves was lower when 2,4,5-T was sprayed on the whole plants right after topping. Compared with the untreated check, there was a 37 to 43 percent decrease in nicotine, 10 to 30 percent increase in reducing sugars, 75 to 125 percent increase in quality index, and 39 to 45 percent increase in petroleum ether extract in cured leaves of tobacco treated with 2,4,5-T. (Auth. Abs.)

81-0332. Meshchenakova, V. D.; Yeletskaia, E. V. Vlianiye Mineral'nykh Udobrenii na Urozhai i Kachestvo Tabaka. [The Effects of Mineral Fertilizer on the Yield and Quality of Tobacco.] *Tabak* (4) 55-56, 1979, Russian.

The total crop capacity and the yield of good quality tobacco varieties were determined in 3-year field tests at a Kirghiz experimental station, using variable doses of mixed mineral fertilizers. The fertilizer mixture consisted of superphosphate, potassium chloride, and ammonium nitrate in different proportions. The most constant increase in the yield of good quality tobacco was obtained with a  $N_{120}P_{120}K_{60}$  fertilizer composition. Under this condition, the 3-year average content of nicotine in tobacco leaves was 0.49 percent, that of proteins 10.86 percent, and of carbohydrates 9.43 percent. Tobacco aroma and flavor were also evaluated. The tests showed that the addition of nitrogen to a typical gray soil for tobacco is the most efficient fertilizer treatment. Phosphorus and potassium affect the yield and quality of raw tobacco only slightly, but they eliminate the negative effect of an exclusively nitrogen supply.

81-0333. Petrov, P.; Vartanian, A.; Parshikova, A.; Buchvarova, I. Mineralno Khranene i Promeni v Kachestvoto i Khimicheskiia Sustav na Tlutun Virzhinlia. [Mineral Fertilizer Supply and Changes in Quality and Chemical Composition of

Virginia Tobacco.] *Bulgarski Tlutun* 25(5): 28-32, 1980, Bulgarian.

Results are analyzed of a 2-year field test of different mineral fertilizers for Virginia tobacco plants in an alluvial-diluvial soil. On nonfertilized soil, the dry tobacco yield was 213 kg/decare, with 61 percent being top grade. The yield increased to 250 kg/decare with 3 kg nitrogen and 5-6 kg/decare phosphorus ( $P_2O_5$ ) fertilizer. Potassium addition did not significantly increase tobacco yield, nor did it change the percentage of top grade tobacco. The importance of regular watering of the plants is stressed. The average nicotine content of dry tobacco was 0.75 percent without fertilizer, 0.95 percent with nitrogen, phosphorus, potassium fertilizers  $N_{25}P_5$  or  $N_{25}P_5K_5$  and 1.06 percent with  $N_5P_{10}K_{10}$  fertilizer compositions. Data are given on biologically assimilated principal nutritive elements in Virginia tobacco. These data may be used as a base for establishing standard fertilizer compositions for optimizing yield and quality of tobacco.

81-0334. Tso, T. C.; Chaplin, J. F. Simple Correlation and Multiple Regression Among Leaf Characteristics, Smoke Components, and Biological Responses of Bright Tobaccos. U.S. Department of Agriculture, Agricultural Research Service, Technical Bulletin No. 1551, May 1977, 137 pp.

A study was made to obtain basic knowledge under a well-designed plan for all scientists concerned with the tobacco problem. Data generated from this study are used to determine simple correlations and multiple regressions among leaf characteristics, smoke components, and certain biological responses, and to establish possible effects of certain smoke components on biological responses. Four Bright tobacco cultivars (*Nicotiana tabacum* L.), each with leaves from eight stalk positions, were used. A total of 151 variables were investigated, including 102 leaf and agronomic characteristics, 42 cigarette and smoke components, and 7 biological responses. The results indicated clearly that certain leaf characteristics can be used as "markers" to predict total smoke delivery or individual smoke components. These findings demonstrated that modification of these markers through genetic, cultural, or curing manipulation may lead to the development of leaf tobacco of more desirable quality and usability.

## CHEMISTRY

81-0335. Dirnck, P.; Veys, J.; Decloedt, M.; Schamp, N. Head-Space Enrichment on Tenax for Characterization and Flavor Evaluation of Some Tobacco Types. *Tobacco International* 182(26): 125-129, December 26, 1980.

A method to analyze volatile components in the headspace vapor of heated tobacco has been developed. Helium was passed through a sample of tobacco, which was slowly heated, and the eluted constituents were adsorbed by a polyaromatic polar polymer trap. After desorption in a helium flow and reconcentration in a cooling trap, the volatile components

were injected into a gas chromatograph equipped with a capillary OV-1 column. The advantages of the described method are fast isolation and analysis, qualitative and quantitative reproducible gas chromatograph (GC) patterns, and representative volatile composition for different varieties. The method can be used for distinguishing (and eventual flavor quality evaluation of) different tobacco varieties or blends. Different analyses of two typical Belgian tobacco varieties (Semols and Appel terre) and of American and African flue-cured tobaccos showed reproducible GC patterns with important differences between the varieties. Their volatile composition was determined by gas chromatography—mass spectrometry coupling. (Auth. Abs.)

**81-0336.** Ghosh, S. K.; Gokani, V. N.; Thakker, M. N.; Patel, J. G.; Kashyap, S. K.; Chatterjee, S. K. **A Comparative Study on the Different Methods of Nicotine Estimation.** *Pesticides* 13(7): 56-58, July 1979.

A comparative study on the different methods for nicotine estimation has been carried out. Conveniently, these methods can be categorized into three main groups, by thin-layer chromatography, extraction with n-heptane, and distillation. Merits and demerits of each method have been considered. Out of all the methods studied here, the process involving extraction with n-heptane appears best. The range of nicotine excretion among Indian smokers' urine has been found to be between 400 and 2400 µg/l of urine and this has been worked out by the method of extraction with n-heptane. (Auth. Abs.)

**81-0337.** Good, B. W.; Parrish, M. E.; Douglas, D. R. **Volatile Phase Profiling of Mainstream Smoke by Glass Capillary Gas-Chromatographic Techniques.** *Journal of High Resolution Chromatography and Chromatography Communications* 3(9): 447-451, September 1980.

A heated injection system for a microprocessor-controlled gas chromatograph (GC) has been developed for the (GC)<sup>2</sup> analysis of the volatile phase of whole smoke of a cigarette. Effects of injection port temperature and the presence of a Cambridge filter pad are demonstrated. Chromatograms are presented for smoke samples with and without a Cambridge Filter with the sample valve oven at 25°, 165°, and 205°C. The use of a flame ionization and a nitrogen-phosphorous detector is illustrated. (Auth. Abs.)

**81-0338.** Gori, G. B. (Editor). **Toward Less Hazardous Cigarettes. The Fourth Set of Experimental Cigarettes.** U.S. Department of Health, Education, and Welfare, National Institutes of Health, National Cancer Institute, Smoking and Health Program, Report No. 4, March 1980, 220 pp.

The experiments of the fourth set of cigarettes begun in 1975, based on results from the first three experiments and on agronomic and other factors are reported. Burley and Bright tobacco were used to test each of these leaves as reconstituted

tobacco sheet (RTS), to test homogenized leaf curing, and to test the effects on tumorigenicity of the full return of stems. Both paper and slurry processes of converting to RTS were investigated as well as cigarettes made from (1) pesticide-free tobacco leaves, (2) pesticide-treated tobacco leaves, and (3) expanded tobacco stems (freon). Resulting yields of smoke constituents were determined. Repeat tests of the effects of cigarette paper porosity on resulting condensate tumorigenicity were performed. Experimental cigarettes made from artificial tobacco substitutes were also evaluated. The results were summarized. Overall, the Bright tobacco produced condensates slightly less tumorigenic than the Burley tobacco, based on results from the mouse skin painting. However, the Bright and Burley variates were comparable with respect to selected chemical yields. One of the paper process cigarettes (10 percent cellulose fiber additive, nicotine added back in the form of nicotine citrate) had the lowest measure of survival for all variates tested at two dose levels. Otherwise, both the paper and slurry processed tobacco had survival measures either comparable to or significantly higher than the reference cigarette. No significant differences were observed between cigarettes made from pesticide-treated tobacco leaves and pesticide-free tobacco leaves. Based on both skin painting bioassays and yields of selected chemicals measured in the condensates, cigarettes made from expanded stems were significantly less tumorigenic than the reference cigarette. A positive correlation was observed between nicotine content of condensate and biological response. Because of variations in condensate yields, it is not clear from these experiments if the correlation reflected a causal relationship. Results from this fourth experiment support the finding from the third experiment that, in the design of less tumorigenic cigarettes, it may not be necessary to go beyond a paper porosity of approximately 60 cm/min. However, as pointed out in the report on the third experiment, toxic gas phase constituents can be reduced further through the use of more porous paper.

**81-0339.** Grinberg, I. P. **Ekspress-Metod Opredeleniia Khlora v Tabake. [Rapid Method for Chlorine Determination in Tobacco.]** *Tabak* (2): 19-21, 1979, Russian.

The development and application of a highly accurate rapid method of chlorine determination in tobacco are described. The method is based on Mohr's argentometric method and consists of the dry incineration of a specimen in the presence of magnesium oxide adsorbent and the subsequent direct titration of the ash aqueous extract with silver nitrate. The time required for a single analysis using the new method is reduced by a factor of 1.6 in comparison with the standard (control) method of wet incineration and back titration. Also, silver nitrate consumption is reduced by a factor of 5 to 6, the analytical procedure is simplified, and operating conditions are improved. The relative error of a determination varies from 0.11 to 1.1 percent, which is about the same as that of the control method. The new method is recommended for serial determination of chlorine in raw tobacco and tobacco products.

81-0340. Grubner, O.; First, M. W.; Huber, G. L. Gas Chromatographic Determination of Nicotine In Gases and Liquids With Suppression of Adsorption Effects. *Analytical Chemistry* 52(11) 1755-1758, September 1980.

Prior reports have indicated that analysis of nicotine at pg/ml levels was unreliable. Significant and variable nicotine adsorption on the different materials used during analysis was recognized as a source of error, and suppression of nicotine adsorption phenomena during sample preparation by addition of ammonium hydroxide was found to be a critical factor in obtaining reliable results at this concentration. This method has been adapted, using a nitrogen-sensitive detector and gas chromatographic techniques, to determine nicotine reproducibly in air, water, and blood plasma. The lowest detectable amount is 2-5 pg of nicotine injected into the column, and the calibration curve is linear up to 2,000 ng/ml. The relative standard error of estimate of peak area dependence on concentration is 8 percent (Auth. Abs.)

81-0341. Hsu, S. C.; Pollack, R. L.; Hsu, A. F. C.; Going, R. E. Sugars Present in Tobacco Extracts. *Journal of the American Dental Association* 101(6): 915-918, December 1980.

The presence of fructose, glucose, sucrose, maltose, and isomaltose in loose leaf chewing tobacco (pouch), pressed chewing tobacco (plug), powdered tobacco (snuff), and natural tobacco leaves was identified and quantitated. Gas-liquid chromatographic studies showed that these five types of sugar were present in the water-soluble extracts of pouch and plug chewing tobacco, yet only fructose and glucose were found in extracts of snuff and unprocessed natural tobaccos. The amount of sucrose present in pouch chewing tobacco was twice that in plug chewing tobacco. No detectable amount of sucrose was found in snuff or unprocessed natural tobaccos. The content of maltose and isomaltose was much less than the content of fructose, glucose, or sucrose. All unprocessed natural tobacco leaves studied as controls contained low amounts of fructose and glucose and no detectable amounts of sucrose, maltose, or isomaltose. The larger amounts of fructose and glucose and the additional sucrose, maltose, and isomaltose present in pouch and plug chewing tobaccos are probably added during the manufacturing process. (Auth. Abs. Mod.)

81-0342. Ishizu, Y.; Ohta, K.; Okada, T. The Effect of Moisture on the Growth of Cigarette Smoke Particles. *Beitraege zur Tabakforschung International* 10(3): 161-168, October 1980.

The effect of water vapor on the growth of cigarette smoke particles was investigated by a light-scattering method which can measure the particle size distribution and the refractive index. The particle growth, below 90 percent relative humidity, was less than 10 percent for both mainstream and sidestream smoke. The results were discussed with equations derived from the weight changes of smoke condensate in

moist air, and with the changes of the refractive index. Calculations showed that the cigarette smoke particle reaches equilibrium very quickly and that it doubles its radius at about 99.5 percent relative humidity. (Auth. Abs.)

81-0343. Jenkins, R. W., Jr.; Chavis, M. K.; Bass, R. T.; Osden, T. S. Cigarette Smoke Formation Studies. VI. The Carbon Contribution to Total Smoke From Each Individual Component in the 1R1-Type Cigarette. *Beitraege zur Tabakforschung International* 10(3): 145-148, October 1980.

Shown for the first time is the contribution of carbon into each smoke phase from each ingredient in the 1R1-type cigarette. In many cases, the actual percentage contribution is greatly different from the theoretical contribution assumed correct for many years. The Bright lamina is a larger carbon contributor to mainstream total particulate matter (MS-TPM) than expected and the Bright stem contributes considerably less. These data imply that Burley tobacco contributes more than the expected amounts of carbon to those smoke components which are more easily condensable, as compared to Bright tobacco, which contributes more than expected to the nonvolatile particulate phase and less to the condensable phase. The cigarette paper was shown to contribute a disproportionate share of carbon to the sidestream total particulate matter (SS-TPM). Glycerol was shown to contribute heavily to the MS-TPM, in keeping with what would be expected for distillable materials. (Auth. Abs.)

81-0344. Kozlowski, L. T.; Rickert, W. S.; Robinson, J. C.; Grunberg, N. E. Have Tar and Nicotine Yields of Cigarettes Changed? *Science* 209(4464): 1550-1551, September 26, 1980.

In official assays of the tar and nicotine yields of 12 popular brands of Canadian cigarettes, smoking machines took fewer puffs, on the average, in 1974 than in 1969. The decline in puffs appears to have been a major cause ( $p < 0.01$ ) of the reported reductions in tar and nicotine yields during this period. Two U.S. cigarette brands that were included in some or all of the surveys also showed significant correlations between puffs and tar ( $p < 0.01$ ). (Auth. Abs. Mod.)

81-0345. Kratchanov, C. G.; Kirtchev, N. A.; Kabakov, A. D.; Tashev, K. A. Characteristics of Tobacco Pectin. *CORESTA Information Bulletin* (2): 20-24, 1979.

This paper presents the data from a study of pectic substances in tobacco leaves by a new method attempting to provide reliable and reproducible results. Data from previous studies are given for comparison with the results of the present study. First, three Bulgarian (one nonfermented and two fermented) and two American cigarette tobaccos are analyzed by the new method for determining characteristics (e.g., polyuronic content and degree of esterification) of total pectic substances and extracted pectins. The polyuronic content (PC) of these five tobaccos ranged from 8.7 percent

(in American tobacco) to 13.9 percent (in Bulgarian tobacco). The two fermented Bulgarian tobaccos had lower polyuronic content than nonfermented (11.2 and 11.4 percent vs. 13.9 percent, respectively). However, it is noted that the degree of esterification (DE) of tobacco pectin was approximately 50 percent as determined by this method, while DE ranged between 16 and 32 percent in previous studies. Next, four varieties of nonfermented Bulgarian tobacco are analyzed at five different harvest times. The data for PC and DE do not vary with harvest time.

**81-0346.** Naidenov, M. B.; Raikov, L. P. *Neutron-Activation Analysis of Plant Materials. Bulgarska Akademia na Naukite Doklady* 33(2): 273-276, 1980.

Neutron activation analysis (NAA) was used to examine the possibilities it offers for analyzing the chemical composition of plants and plant products as well as to compare this method with other analytical methods. A variety of plants was analyzed including wheat, alfalfa, apple leaves, and tobacco. The elements determined were divided into three subgroups: Group I, Group II, and Group III elements. It was concluded that the NAA data were consistent with results obtained by conventional testing methods, and that NAA enables simultaneous determination of a large number of macro-, micro-, and rare-earth elements.

**81-0347.** Nemet, M. *3,4-Benzpyren Meghatározása a Cigarettafüstben Spektrofotometriás Módszerrel. [Determination of 3,4-Benzpyrene in Cigarette Smoke by a Spectrophotometric Method.] Dohányipar* (2): 41-44, April-June 1980.

A spectrophotometric method is described for the quantitative determination of 3,4-benzpyrene, which is one of the most biologically active compounds among the polycyclic aromatic hydrocarbons occurring in cigarette smoke. (Auth. Abs. Mod.)

**81-0348.** Nishida, T.; Pilotti, A.; Enzell, C. R. *Carbon-13 Nuclear Magnetic Resonance Spectra of Nicotine Metabolites and Related Compounds. Organic Magnetic Resonance* 13(6): 434-437, 1980.

The potential of  $^{13}\text{C}$  nuclear magnetic resonance (NMR) techniques for studies of nicotine metabolism has been investigated by acquisition and assignment of  $^{13}\text{C}$  NMR spectra of nicotine, its metabolites, and some related compounds. It is shown that C-2' of nicotine would be the best site for  $^{13}\text{C}$ -labeling when using the method to gain further insight into the metabolic pathways of nicotine. (Auth. Abs.)

**81-0349.** Ono, J.; Ogasa, K.; Maeda, K.; Noguchi, K. *Preferential Retention of Benzo(a)pyrene in Tobacco Smoke by  $\beta$ -Lactoglobulin in the Cigarette Filter Structure. Journal of*

*Agricultural and Food Chemistry* 29(1): 173-177, January-February 1981.

Preferential retention of benzo(a)pyrene in tobacco smoke by  $\beta$ -lactoglobulin, added to the cigarette filter structure, was studied. The retention rate of benzo(a)pyrene in tobacco smoke by the cigarette filter varied, dependent upon the dose of  $\beta$ -lactoglobulin which was introduced to the filter, while those of smoke condensate and nicotine in tobacco smoke remained at the constant level throughout the doses of  $\beta$ -lactoglobulin in the present study. Twenty milligrams of  $\beta$ -lactoglobulin in a cigarette filter tip was estimated to be capable of reducing the benzo(a)pyrene concentration in the dry total particulate matter to a level of half that in intact tobacco smoke. (Auth. Abs.)

**81-0350.** Perinelli, M. A.; Carugno, N. *Determination des Traces de Metaux Dans la Fumee de Cigarette par Spectrometrie d'Absorption Atomique. [Determination of Trace Metals in Cigarette Smoke by Atomic Absorption Spectrometry.] Annales du Tabac. Section I* (17): 19-27, 1979, French.

A method for the determination of metals in cigarette smoke and tobacco by flameless atomic absorption spectrometry was extended to the determination of chromium, cobalt, and copper. The possibility of compensating the nonspecific absorption was examined in the course of the determinations, by using a hydrogen continuous lamp. An attempt was also made to limit any chemical interferences of the matrix through various devices. The influence of cigarette paper porosity in the transfer process of metals into smoke was also studied. (Auth. Abs.)

**81-0351.** Perovic, D.; Maric, D.; Herak, M. *Istrazivanja Sadržaja Nekih Elementa u Tragovima u Duhanu Tipa Virginija na Području Sjeverne Hrvatske. [Investigations of Trace Elements Content of Virginia Type Tobacco in North Croatia Region.] Tutun—Tobacco* (11/12): 519-529, 1977, Serbo-Croatian.

In flue-cured Virginia tobacco harvested in North Croatia in 1976, the trace elements lithium (Li), copper (Cu), zinc (Zn), lead (Pb), manganese (Mn), and iron (Fe) were determined. These same elements were also determined in the soil where the tobacco was grown. For this study, the regions around Kutjevo, Virovitica (Dolta), and Bistrica were selected as representatives of flue-cured tobacco soils. The elements were determined by atomic absorption spectrophotometry and flame emission. In the tobacco samples studied 2.3-10.6 ppm Li was found. In the soil there was 11.1-28.0 ppm Li. Thus, the content of lithium in the tobacco followed the same pathway as that in the soil. The Cu content in the tobacco varied from 6.2 to 7.4 ppm, which was below the physiological need of tobacco. Similarly, the soil had only 10.3-26.8 ppm of Cu. There was 20.6-27.5 ppm of Zn in the tobacco and 47.3-76.3 ppm of Zn in the soil, which was sufficient for the physiological needs of tobacco. The content of Pb in the

tobacco varied from 5.2 to 6.7 ppm and in the soil from 12.2 to 16.7 ppm. The higher content of Pb in tobacco could be dangerous for health. The Mn content in the tobacco samples varied from 53.5 to 205.3 ppm, and in the soil from 454 to 530 ppm. In tobacco, 92-303 ppm Fe was found, and in the soil 1.31-2.53 percent. The quantities of Mn and Fe in the soil were sufficient for the physiological needs of the tobacco plant. The results of this study suggest that the determined quantities of the trace elements in the tobacco were considerably lower in comparison with some major world types of tobacco. The results from this study also indicate that the soil from North Croatia had sufficient quantities of the studied trace elements except copper for the normal physiological processes of tobacco. (Auth. Abs.)

**81-0352.** Richter, M., Erfurth, I. *Über die gaschromatographische Bestimmung von Acrolein in dessen Urzustand im Hauptstromrauch von Zigaretten. Beschreibung einer Analyse-methode für Serienbestimmungen.* [On the Gas Chromatographic Determination of Acrolein in Its Original State in the Main Stream Smoke of Cigarettes. Description of an Analysis Method for Serial Determinations.] *Berichte des Institute fuer Tabakforschung* 26: 36-45, 1979, German.

An analysis method for quantitative serial determinations of acrolein in its original state in the mainstream smoke of cigarettes is described. Both the smoking equipment and the filter holder are directly connected with the gas sample inlet valve of a gas chromatograph. This arrangement allowed a direct gas chromatographic analysis of an aliquot volume of a single puff with an analysis rhythm of 90 min. Figures are given of an equipment scheme, the calibration curve, and a gas chromatogram. (Auth. Abs.)

**81-0353.** Ruhl, C., Adams, J. D., Hoffmann, D. *Chemical Studies on Tobacco Smoke LXVI. Comparative Assessment of Volatile and Tobacco-Specific N-Nitrosamines in the Smoke of Selected Cigarettes From the U.S.A., West Germany and France.* *Journal of Analytical Toxicology* 4(5): 255-259, September-October 1980.

Studies on the variations of biologically important smoke constituents of popular cigarettes in several European countries and in the United States include investigations on the types and levels of volatile (VNA) and tobacco-specific nitrosamines (TSNA). Gas-liquid chromatograph-thermal energy analyzer (T-EA) and high pressure liquid chromatography (HPLC) methods are used to determine the VNA and TSNA in mainstream and sidestream smoke of cigarettes. This report presents data on the smoke of some West German cigarettes which demonstrate that the VNA levels are about the same as those in the smoke of U.S. cigarettes; but that they are lower than those in the smoke of French cigarettes made of dark tobacco types. The tobacco-specific nonvolatile N-nitrosamines determined in the mainstream smoke of

commercial U.S. blended cigarettes (*N*-nitrosoanatabine, *N*-nitrososnicotine and 4-(*N*-methyl-*N*-nitrosamino)-1-(3-pyridyl)-1-butanone together) ranged from 680 to 830 ng/cigarette, while those for commercial West German products ranged from 340 to 780 ng/cigarette in nonfilter brands and from 180 to 450 ng in filter-tipped cigarettes. The analyzed French products contained from 1,010 to 1,380 ng of these compounds in the smoke of each cigarette. (Auth. Abs.)

**81-0354.** Stepney, R. *Tar: Nicotine Ratio of Cigarettes 1973-79.* (Letter). *Lancet* 2(8139): 422-423, August 25, 1979.

Tar (T) and nicotine (N) yields of cigarettes in Great Britain have fallen over the 1973-1979 period, with tar yields declining faster than nicotine, resulting in a progressive reduction of the average T:N ratio. For example, 1 mg nicotine from a cigarette would have been associated with an average tar yield of 15.8 mg in 1972, as compared to 13 mg in 1978. The author states that tobacco technology appears to be engaged in a health-related modification in cigarette design, a step it has repeatedly been urged to take.

**81-0355.** Witas, T.; Sledziewski, P. *Malonal Generation Conditions of the Tobacco Smoke.* *Die Nahrung* 24(3): 243-249, 1980.

The possibility of malonic dialdehyde formation from tobacco smoke compounds was investigated, and the conditions for determining the degree of malonal generation from smoke compounds were established. The smoke of several filtered and nonfiltered cigarette brands was analyzed for malonal content. The mean malonal concentration in the smoke of cigarettes with filters was lower (28.7 mg/kg) than in the smoke of cigarettes without filters (35.0 mg/kg). The highest malonal contents were found in smoke from two filter cigarette brands and one nonfilter brand (41.7, 35.2, and 42.6 mg/kg, respectively). One filter brand had approximately half these malonal contents (i.e., 17.8 mg/kg).

**81-0356.** Yoshida, D.; Matsumoto, T. *Amino- $\alpha$ -Carbolines as Mutagenic Agents in Cigarette Smoke Condensate.* *Cancer Letters* 10(2): 141-149, 1980.

Two mutagenic agents, 2-amino-9H-pyrido(2,3-b)indole and 2-amino-3-methyl-9H-pyrido(2,3-b)indole (amino- $\alpha$ -carbolines) have been isolated from cigarette smoke condensate for this study. The former agent varied in amounts from a low of 25 ng/cigarette in the smoke of flue-cured tobacco, to a high of 258 ng/cigarette in a cigarette of Japanese domestic variety. The latter ranged in amounts from 9 to 37 ng/cigarette. The contents of these mutagens in the smoke condensate were positively related to an increase in mutagenic activity of *Salmonella typhimurium* TA 98. (Auth. Abs.)

See also, 81-0330, 81-0447, 81-0622

## PHARMACOLOGY AND TOXICOLOGY

**81-0357.** Abrams, W. R.; Eliraz, A.; Kimbel, P.; Weinbaum, G. The Effect of the Oxidizing Agents Chloramine-T and Cigarette Smoke on Dog Serum Proteinase Inhibitor(s). *Experimental Lung Research* 1(3): 211-223, 1980.

Dog serum treated with the oxidant chloramine-T is rapidly and selectively depleted of its ability to inhibit porcine pancreatic elastase or dog neutrophil elastase. Trypsin inhibitory capacity of serum is not affected. Purified dog  $\alpha$ -1-proteinase inhibitor ( $\alpha$ -1-PI) is similarly oxidized with an apparent rate constant of  $1.1 \times 10^3 \text{ M}^{-1} \text{ sec}^{-1}$ . Reversal of the oxidative inactivation using dithiothreitol was demonstrated. Cigarette smoke also directly affects the inhibitory capacity of both serum and pure  $\alpha$ -1-PI. The maximum inactivation observed was a 45 percent decrease in inhibitory capacity. These studies form a basis for developing a model of functionally deficient  $\alpha$ -1-PI by taking advantage of oxidative inactivation of normal proteinase inhibitor levels. (Auth. Abs. Mod.)

**81-0358.** Ali, B.; Kaur, S.; Kumar, A.; Bhargava, K. P. Comparative Evaluation of Stimulatory Effects of Oral Tobacco and Nicotine Consumption on Hepatic Microsomal N-Demethylations. *Biochemical Pharmacology* 29(22): 3087-3092, November 15, 1980.

The present study was designed to investigate and compare the effects of chronic oral tobacco and nicotine consumption on hepatic microsomal drug metabolizing enzymes (DME) responsible for N-demethylation of amidopyrine, morphine, and pethidine in rats. Chronic administration of tobacco for 28 days resulted in a marked increase in the rate of N-demethylation of amidopyrine, morphine, and pethidine. Such tobacco treatment stimulated amidopyrine and pethidine N-demethylations about 2.5-fold but that of morphine less than 2-fold. The N-demethylation of these drugs was not affected by tobacco treatment for 2 and 7 days. Attempts were made to evaluate the role of nicotine in stimulation of DME by oral tobacco intake. Tobacco was found to contain  $4.3 \pm 0.18$  percent nicotine on a dry weight basis. Although the magnitude of elevation in microsomal N-demethylations of these drugs by chronic oral intake of nicotine for 28 days was comparable to that obtained by tobacco treatment, there was marked difference in the substrate specificity in stimulation of amidopyrine and morphine N-demethylations. Nicotine treatment for 2 and 7 days, like tobacco, was also devoid of any influence on the microsomal N-demethylations. Both tobacco and nicotine inhibited in vitro biotransformations of amidopyrine, morphine, and pethidine to their demethylated metabolites, and the degree of inhibition in the two cases did

not differ much when compared for different substrates. Preincubation studies demonstrated that the inhibition of amidopyrine N-demethylation by tobacco increased with time but remained unaffected by nicotine. The nature of inhibition of amidopyrine N-demethylase by tobacco and nicotine was noncompetitive and competitive, respectively. The activities of hepatic microsomal N-demethylases were unaffected in rats killed after 1 hr of a single oral dose of tobacco or nicotine. Therefore, it may be interpreted that stimulation of DME is possibly due to de novo synthesis of DME. (Auth. Abs.)

**81-0359.** Bardell, D.; Smith, J. E. An *In Vitro* Study of the Exposure of Mixed Populations of Normal Oropharyngeal Bacteria to Cigarette Smoke. *Microbios* 26(105/106): 159-164, 1979.

Mixed populations of freshly isolated oropharyngeal bacteria growing in dextrose broth at 37°C were subjected to smoke from four cigarettes over a 3-hr period. Each cigarette, a commercially available brand, contained 23.0 mg of tar and 1.4 mg of nicotine. At hourly intervals eight puffs of smoke from a cigarette were passed over a 1.0 ml suspension of bacteria dispersed in a thin layer in a sterile tissue culture flask. Normal filtered air was in contact with the suspension between smoke treatments. Exposure to cigarette smoke resulted in a marked decrease in numbers of viable bacteria. Nonfilter cigarette smoke had a greater detrimental effect than smoke from filter-tipped cigarettes. The predominant bacteria, nonhemolytic streptococci, and less numerous bacteria such as staphylococci, were equally sensitive to the toxic action of cigarette smoke. (Auth. Abs.)

**81-0360.** Baumgartner, H.; Coggins, C.R.E. Description of a Continuous-Smoking Inhalation Machine for Exposing Small Animals to Tobacco Smoke. *Beitraege zur Tabakforschung International* 10(3): 169-174, October 1980.

An inhalation machine is described which permits the simultaneous exposure of up to 72 rodents to a continuous flow of freshly diluted cigarette smoke. The smoke can be diluted to any required concentration from 0.5 to 20 percent (v/v).

**81-0361.** Bridges, R. B.; Hsieh, L.; Haack, D. G. Effects of Cigarette Smoke and Its Constituents on the Adherence of Polymorphonuclear Leukocytes. *Infection and Immunity* 29(3): 1096-1101, September 1980.

The *in vitro* effects of the water-soluble fraction of whole cigarette smoke (WSF) and two  $\alpha,\beta$ -unsaturated aldehydes of cigarette smoke (acrolein and crotonaldehyde) on polymorphonuclear leukocyte (PMNL) adherence were determined with nylon fiber columns. Each of these cigarette smoke constituents caused a dose-dependent inhibition of PMNL adherence. However, at least fivefold higher concentrations of these agents were necessary to inhibit adherence as compared with those necessary to achieve the same level of inhibition of PMNL chemotaxis. Furthermore, inhibition of adherence by WSF could be differentiated from its effects on chemotaxis in that reduced glutathione completely protected chemotaxis from the effects of WSF but only afforded partial protection to PMNL adherence. These data suggest that the inhibitory effects of WSF, acrolein, and crotonaldehyde on PMNL chemotaxis are not due to their inhibition of adherence. Finally, although PMNL adherence is considered to be an integral part of the chemotactic mechanism, differentiation between these two PMNL functions may be possible, since some inhibitors of chemotaxis do not have corresponding inhibitory effects on adherence. (Auth. Abs.)

**81-0362.** Brown, C. P.; Spivey, G. H.; Valentine, J. L.; Browdy, B. L. **Cigarette Smoking and Lead Levels in Occupationally Exposed Lead Workers.** *Journal of Toxicology and Environmental Health* 6(4): 877-883, July 1980.

A total of 111 workers at a secondary lead (Pb) smelter were surveyed to determine smoking and personal hygiene habits. Of the smokers, 53 percent had blood Pb levels in excess of 60  $\mu\text{g}/\text{dl}$ , compared to 31 percent of nonsmokers ( $p=0.02$ ). Among smokers, 66 percent of heavy smokers ( $\geq 1$  pack/day) had blood Pb levels over 60  $\mu\text{g}/\text{dl}$ , compared to 39 percent of the light smokers ( $p=0.05$ ). Those who kept their cigarettes on their person had a higher proportion of blood Pb greater than 60  $\mu\text{g}/\text{dl}$  than workers who kept their cigarettes elsewhere (63 vs. 36 percent, respectively;  $p=0.08$ ). The difference in blood Pb levels between smokers and nonsmokers may be due in part to direct environmental contamination of cigarettes or impaired lung clearance mechanisms, and could be important in workers with already elevated blood Pb levels. (Auth. Abs.)

**81-0363.** Brunzell, J. D.; Goldberg, A. P.; Schwartz, R. S. **Cigarette Smoking and Adipose Tissue Lipoprotein Lipase.** *International Journal of Obesity* 4(2): 101-103, 1980.

Adipose tissue lipoprotein lipase activity was measured in 10 otherwise healthy smokers (who smoked at least 20 cigarettes per day) and compared with that of 12 nonsmoking controls. Adipose tissue lipoprotein lipase activity was significantly higher ( $p<0.001$ ) in smokers ( $5.4 \pm 2.6$  mU/ $10^9$  cells) than in controls ( $1.9 \pm 0.7$  mU/ $10^9$  cells) of similar weight. (Auth. Abs. Mod.)

**81-0364.** Carp, H.; Janoff, A. **Inactivation of Bronchial Mucous Proteinase Inhibitor by Cigarette Smoke and Phagocyte-Derived Oxidants.** *Experimental Lung Research* 1(3): 225-237, 1980.

Freshly prepared aqueous solutions of cigarette smoke suppressed the elastase inhibitory capacity (EIC) of the acid-stable proteinase inhibitor present in bronchial mucus (BMPi) and human seminal plasma (HUSI-I). Thin-layer gel-immunofiltration analysis of mixtures of smoke-treated BMPi and human leukocyte elastase showed decreased elastase and BMPi complexes, and increased uncomplexed BMPi and free elastase. Phenolic antioxidants prevented the suppression of the EIC of BMPi or HUSI-I by cigarette smoke. In addition, treatment of BMPi or HUSI-I with chemical oxidants caused a similar suppression of EIC. Furthermore, treatment of BMPi or HUSI-I with the phagocyte-derived oxidizing system, myeloperoxidase plus hydrogen peroxide plus chloride, suppressed EIC. Finally, the functional activity of BMPi was significantly reduced in tracheal aspirates of human smokers compared to that of nonsmokers ( $p<0.01$ ). These results support the hypothesis that local inactivation of BMPi in the conducting airways of the lung by inhaled cigarette smoke or by phagocyte-derived oxidants may play a role in the pathogenesis of obstructive lung disease in smokers. (Auth. Abs.)

**81-0365.** Chen, L. H.; Chow, C. K. **Effect of Cigarette Smoking and Dietary Vitamin E on Plasma Level of Vitamin C in Rats.** *Nutrition Reports International* 22(2): 301-309, August 1980.

Effects of cigarette smoking and dietary vitamin E on plasma levels of vitamins C and E were studied in rats. Weanling rats were fed a vitamins E- and C-free basal diet with or without 100 i.u. vitamin E per kg diet for 5 weeks. In Experiment I, rats in each group were exposed to either cigarette smoke or sham at the dosages of 120 puffs/exposure/day on day 1 and 50 puffs/exposure/day from day 2 to day 7. In Experiment II, animals were exposed to cigarette smoke or sham 60 puffs/exposure/day for up to 7 days. In both experiments, the rats were killed 16 hours after the 3-day or 7-day exposure, and plasma levels of vitamins C and E were determined. Cigarette smoking for 3 or 7 days resulted in significant decrease in vitamin C levels in the plasma of both dietary groups of animals in the first experiment. In Experiment II, relative to the sham groups, cigarette smoking for 3 days significantly decreased the levels of total, dehydro-, and reduced forms of vitamin C in the plasma of the vitamin E-deficient group ( $p<0.005$ ,  $p<0.005$ , and  $p<0.05$ , respectively); whereas 7-day exposure lowered total and reduced vitamin C levels in both vitamin E-supplemented and vitamin E-deficient groups. Cigarette smoking did not affect plasma level of vitamin E under the experimental conditions. The results suggest that cigarette smoking lowers plasma level of vitamin C, and that sufficient intake of vitamin E appears to aid in maintaining plasma vitamin C at a higher level. (Auth. Abs.)

**81-0366.** Cusack, B.; Kelly, J. G.; Lavan, J.; Noel, J.; O'Malley, K. *Theophylline Kinetics in Relation to Age: The Importance of Smoking.* *British Journal of Clinical Pharmacology* 10(2): 109-114, 1980.

Single dose studies of theophylline kinetics were compared in groups of 13 young and 12 elderly smokers and nonsmokers to assess the effect of age on theophylline absorption and the effect of smoking on drug metabolizing enzyme activity in old age. Results indicate that the rate and extent of absorption was not affected by age. Distribution and elimination kinetics were similar in young and elderly nonsmokers. In young subjects (8 smokers, 5 nonsmokers) the elimination half-life of theophylline was shorter and clearance was significantly ( $p < 0.02$ ) greater in smokers than in nonsmokers. In the elderly (6 smokers, 6 nonsmokers) mean elimination half-life was significantly shorter in smokers and their plasma clearance was 40 percent higher than in nonsmokers ( $p = 0.07$ ). These data indicate that aging per se does not affect theophylline elimination and also that induction of theophylline metabolism due to smoking occurs in old age. Smoking is a variable that should be taken account of when assessing drug metabolism in elderly patients. (Auth. Abs. Mod.)

**81-0367.** Dahlstrom, A.; Booj, S.; Heiwall, P.-O.; Larsson, P.-A. *The Effect of Chronic Nicotine and Withdrawal on Intra-Neuronal Dynamics of Acetylcholine and Related Enzymes in a Preganglionic Neuron System of the Rat.* *Acta Physiologica Scandinavica* 110(1): 13-20, September 1980.

The effect of chronic nicotine treatment, given in the drinking water for 8 to 10 weeks in a dose equivalent to that of a heavy cigarette smoker, and 2 days of nicotine withdrawal on acetylcholine (ACh), choline acetyltransferase (CAT), and ACh-esterase (AChE) activities in the preganglionic cervical nerve and the superior cervical ganglia (SCG) of rats, was studied. Control rats were housed and handled as the nicotine rats. After cutting the preganglionic nerve 7-19 hrs before dissection, ACh, CAT, and AChE accumulated in the nerve part proximal to the cut (relative to the nerve cell bodies in the spinal cord). A clearance of these substances was observed in the nerve distal to the cut. This indicates that all three substances are transported proximo-distally in this preganglionic cholinergic nerve. In the SCG, ACh was decreased already by 7 hrs (to about 60 percent), while CAT and AChE-activities were lowered to 60 and 80 percent, respectively, at 19 hrs after cutting the nerve. Chronic nicotine treatment caused an increased ACh accumulation (by about 35 percent) and a decreased CAT accumulation (by about 20 percent) in the cut nerve, while the ganglionic levels of all three substances were essentially unchanged. Withdrawal of nicotine for 2 days prior to the final experiments caused a reduced ACh-accumulation (by about 30 percent) in the nerve and normalized the CAT accumulation. The AChE-activity of intact nerve was markedly increased to about 175 percent of control, and the transportable fraction of AChE (clearance distal to the cut) was about twice as large as in

control. In the SCG withdrawal caused marked changes in the ACh content, which was decreased to 62 percent of control. CAT-activity was increased to 117 percent of control while AChE was unchanged. The hypothesis that explains the results is that chronic nicotine treatment and in particular withdrawal of nicotine may cause marked alterations in the activity of the preganglionic neuron. This may induce changes in the intra-axonal transport of the three substances and an increased turnover of ACh in the nerve terminals of the SCG after withdrawal of nicotine. (Auth. Abs.)

**81-0368.** Demarini, D. M. *Mutagenicity of Cigarette Smoke Condensate in *Neurospora crassa* and *Salmonella typhimurium*.* Doctoral Dissertation, Illinois State University, University Microfilms International 80-24304, 1980, 183 pp.

The mutagenicity of cigarette smoke condensate (CSC) and fractions of CSC was investigated in *Neurospora crassa*, both in the presence and in the absence of S-9 mix (S-9 plus cofactors). Forward mutation was assayed at the adenine-3 region of two-component heterokaryons. The mutagenicity of CSC was studied in a suspension test consisting of conidia, buffer or S-9 mix containing Aroclor-1254-induced rat hepatic microsomes, and CSC at various concentrations. In the absence of S-9 mix, direct-acting mutagens were found in CSC, an enriched polycyclic aromatic hydrocarbon (EPAH) fraction, and a basic fraction (Swain 5). No direct-acting mutagens were detected in an acidic fraction (Swain 8). In the presence of S-9 mix, CSC and the EPAH fraction were also mutagenic, but at higher doses than in the absence of S-9 mix. The dose range, survival curves, and mutation-induction curves were not significantly different when CSC was used in the presence of unheated or heat-inactivated S-9. Smoke condensate killed conidia of *N. crassa* by a cytoplasmic, rather than by a nuclear, mechanism. The mutagenic potency of CSC was similar in either a repair-sufficient or a repair-deficient strain of *N. crassa*. The effects of light, pH, temperature, and concentration of solvent (DMSO) were investigated. In addition, the mutagenicity of nine fractions of CSC was studied in *N. crassa* by the growth culture method. The results indicated that *N. crassa* cannot activate CSC or fractions of CSC to mutagens. CSC and 10 fractions of CSC were studied in *Salmonella typhimurium* TA1538 by the preincubation and incorporation methods. In general, preincubation did not enhance the mutagenicity of CSC or the fractions of CSC. This is the first report of the presence of potent, direct-acting mutagens in CSC and in the EPAH and basic (Swain 5) fractions of CSC. (Auth. Abs.)

**81-0369.** Fager, G.; Wiklund, O.; Olofsson, S.-O.; Norfeldt, P.-I.; Vedin, A.; Bondjers, G. *Quantitation of Human Serum Apolipoprotein A-I by Electroimmunoassay. Studies on Some Techniques for Standardization of the Assay and Determination of Serum Apolipoprotein A-I Levels in a Random Population Sample of Middle-Aged Men.* *Scandinavian Journal of Clinical and Laboratory Investigation* 40(5): 451-460, September 1980.



Serum apolipoprotein A-I levels have been determined in a population sample of 76 randomly selected men aged 41-48 years. Electroimmunoassay with a monospecific rabbit antiserum to human apoA-I was used. Different routes to standardization of the electroimmunoassay were exploited. Standardization was finally carried out with purified apoA-I and confirmed with LpA-I. The mean apoA-I level was  $1.75 \pm 0.20$  g/l in the population sample, with a normal distribution of the values. A highly significant, positive correlation to apolipoprotein cholesterol was observed. ApoA-I levels were negatively correlated to tobacco consumption ( $p < 0.05$ ). Significant correlations were also observed to the levels of serum cholesterol and physical activity during leisure time, but no significant correlations to serum triglycerides or body weight index were found. (Auth. Abs.)

**81-0370.** Fogelmark, B.; Rylander, R.; Sjostrand, M.; Reininghaus, W. Free Lung Cell Phagocytosis and the Effect of Cigarette Smoke Exposure. *Experimental Lung Research* 1(2): 131-138, 1980.

A technique for studying phagocytosis in free lung cells with the use of fungal spores is reported. Free lung cells were obtained from a bronchial lavage of guinea pigs, rats, and hamsters. The cells were incubated with fungal spores and the engulfment of these spores was studied at various time intervals and conditions. The phagocytosis process was found to occur from relatively stationary macrophages within the first hours after incubation. The number of engulfed spores was proportional to their number in the solution. Addition of serum or surfactant to the medium increased the phagocytosis rate. In hamsters and rats exposed to tobacco smoke under in vivo conditions, a dose-related increase in phagocytosis rate could be demonstrated. In rats, for instance, the mean number of engulfed spores/cell increased when exposed to cigarette smoke from  $0.92 \pm 0.81$  to  $3.07 \pm 1.00$  ( $p = 0.05$  by two-tailed u-test). The proportion of cells containing  $\geq$  five spores increased from  $4 \pm 7$  to  $49 \pm 9$  ( $p = 0.001$ ). Smoke exposure resulted in a free lung cell total ( $\times 10^6$ ) which was slightly lower than in control animals ( $2.2 \pm 0.8$  vs.  $3.7 \pm 2.7$ , respectively). In hamsters exposed to high and low doses of cigarette smoke, the average number of spores/cell increased from  $1.79 \pm 0.11$  in the low-dose animals ( $p < 0.01$ ) to  $2.62 \pm 0.32$  in the high-dose animals ( $p < 0.01$ ). Cells containing  $\geq$  five spores increased from  $5 \pm 2.6$  percent (control) to  $13 \pm 4.3$  percent (low-dose) to  $28 \pm 7.2$  percent (high-dose) ( $p < 0.001$ ). The total number of free lung cells was similar in control and low-dose animals, but the amount in high-dose animals was roughly six times greater. (Auth. Abs. Mod.)

**81-0371.** Guerin, M. R.; Stokely, J. R.; Higgins, C. E. Tobacco Smoke Inhalation Bioassay Chemistry. In: Griffith, G. W. (Editor). *Tobacco Smoke Inhalation Bioassay Chemistry*, Oak Ridge National Laboratory, Oak Ridge, Tennessee, ORNL-5424, October 1979, 170 pp.

This report, which is composed of a series of individually authored major papers, details the more significant findings and analytical developments of a 3-year inhalation bioassay chemistry research program sponsored by the Council for Tobacco Research-USA, Inc. Its purpose was to define the characteristics of the Walton Horizontal Smoking Machine as an inhalation exposure device for mice. The machine produces cigarette smoke closely representing that produced by humans. The observations obtained are of general utility in evaluating the relevance of inhalation exposure to standing smoke.

**81-0372.** Husgafvel-Pursiainen, K.; Maki-Paakkanen, J.; Norppa, H.; Sorsa, M. Smoking and Sister Chromatid Exchange. *Hereditas* 92(2): 247-250, 1980.

The present survey comprises an analysis of sister chromatid exchange (SCE) frequencies in the peripheral blood lymphocytes of 100 subjects: 83 healthy men and women, both cigarette smokers and nonsmokers, and 17 children. Both for men (30 smokers, 22 nonsmokers) and for women (13 smokers, 18 nonsmokers) the frequency of SCE's is significantly higher ( $p < 0.001$ ) among smokers (group mean  $9.6 \pm S.E. 0.2$ ) than among nonsmokers (group mean  $8.1 \pm S.E. 0.2$ ). No difference is detected in the frequencies of metaphase chromosome aberrations analyzed in the cultured lymphocytes of the same subjects (1.8 percent among smokers and 1.3 percent among nonsmokers when gaps were excluded). Young children (17 subjects, mean age 1.5 years) show a significantly lower frequency of SCE's (mean  $5.1 \pm 0.6$ ) than adults. While the induction of SCE's is known to provide a sensitive indicator of mutagen/carcinogen exposure in experimental assays, it may also give important information of in vivo exposure to genotoxic agents. However, on the basis of the present data, which confirm previous results, the effects of individual smoking habits should carefully be taken into account in evaluations of the effects of exogenous agents on SCE frequencies. (Auth. Abs. Mod.)

**81-0373.** Jacob, C. V.; Stelzer, G. T.; Wallace, J. H. The Influence of Cigarette Tobacco Smoke Products on the Immune Response. The Cellular Basis of Immunosuppression by a Water-Soluble Condensate of Tobacco Smoke. *Immunology* 40(4): 621-627, August 1980.

The immunosuppression exhibited by a water-soluble condensate of tobacco smoke (WSC) has been studied in vivo and in vitro. When multiple sublethal doses of WSC were injected into C57B1/6 mice, their ability to respond to immunization with sheep erythrocytes (SRBC) by the formation of plaque-forming cells was severely inhibited. In addition, spleen cells from WSC-treated mice were unable to mount a primary response to SRBC in vitro. Studies on the cellular basis of the immunosuppression induced by WSC showed a decrease in T lymphocytes in the spleens of WSC-treated mice. Additional experiments were conducted in which isolated populations of T cells, B cells, and macro-

phages from WSC-treated or normal mice were combined and then tested for responsiveness to SRBC in vitro. Results of these experiments also indicated that T cells were particularly susceptible to WSC exposure. T cells from WSC-treated mice were unable to cooperate with normal B cells and macrophages in the response to SRBC. A less marked suppression of B-cell function was noted in condensate-treated mice. While B cells from such animals were able to cooperate with normal T cells and macrophages to give a detectable primary response to SRBC, the response was depressed. In contrast, macrophages from WSC-treated animals enhanced the response of normal T and B cells to SRBC. (Auth. Abs.)

**81-0374.** Jedrychowski, W.; Adamczyk, B.; Jaskolka, D. Poziom Immunoglobulin IgG i IgA w Ślinie i Surowicy z Uwzględnieniem Palenia Tytoniu i Objawów ze Strony Układu Oddechowego. [Level of Immunoglobulins G and A in Saliva and Serum in Relation to Tobacco Smoking and Respiratory Tract Symptoms.] *Pneumologia Polska* 48(2): 63-69, February 1980, Polish.

Determination of IgG and IgA levels in saliva and serum in smokers and nonsmokers was studied to explain the relationship between the incidence of respiratory tract symptoms and endogenous factors. Clinical status of patients was defined by standardized interview concerning symptoms of respiratory tract, physical examination, lung function examination, chest X-ray view, electrocardiography, routine blood biochemical investigation, morphology of peripheral blood, and urine analysis. Immunoglobulin concentration was defined by Mancini's radial immunodiffusion method. Results depend on the age and smoking habit of the examined persons. In saliva, IgG and IgA levels were significantly lower in smokers than in nonsmokers. In serum, the concentrations of IgG and IgA were a little lower in smokers than in nonsmokers. In persons with respiratory tract symptoms, the IgG level in saliva was significantly lower than that in persons without these symptoms. (Auth. Abs. Mod.)

**81-0375.** Keast, D.; Ayre, D. Effects of Chronic Tobacco Smoke Exposure From High-Tar or Low-Tar Cigarettes on the Systemic Clearance Mechanisms of Mice. *Environmental Research* 23: 429-443, 1980.

Mice were exposed to high-tar (HT) (16 mg tar/cigarette) or low-tar (LT) (5 mg tar/cigarette) filtered cigarettes for 8 min per day for up to 30 weeks. Phagocytic and degradative properties of the liver and spleen were assessed using unopsonized and opsonized radioactive sheep erythrocytes (SRBC) inoculated intravenously into naive or immune animals. Initially phagocytosis of unopsonized SRBC was shown to be compromised in HT-tobacco smoke-exposed animals of both the BALB/c and C57Black strains of mice but not for LT-exposed animals of the BALB/c strain of mice. Later phagocytosis was also affected in some instances with opsonized SRBC. Degradation of phagocytosed material

did not appear to be compromised until after 18 weeks of chronic exposure. There was clear evidence of the C57Black strain of mice being more generally affected by tobacco smoke exposure than the BALB/c strain of mice. (Auth. Abs.)

**81-0376.** Keysell, G.; Maundrell, A.; Davies, W. The Variable Effects of Pregnancy on In Vitro Drug Metabolism by Rat Liver Preparations. *Journal of Pharmacy and Pharmacology* 32(Supplement): 37P, December 1980.

The effect of pregnancy on the metabolism of nicotine and 7,12-dimethylbenz(a)anthracene (DMBA) in rats was studied. Liver preparations from rats about 18 days pregnant were used for the in vitro studies. Nicotine metabolites, nicotine-1'-N-oxide and cotinine were determined by gas liquid chromatography and the DMBA derivative, 8,9-dihydrodiol, by liquid scintillation counting. The results indicate a decrease in total nicotine metabolism; however, the two metabolites were affected differently as the cotinine/N-oxide ratio (C/N) increased. DMBA resulted in increased 8,9-dihydrodiol formation.

**81-0377.** Knott, V. J.; Venables, P. H. Separate and Combined Effects of Alcohol and Tobacco on the Amplitude of the Contingent Negative Variation. *Psychopharmacology* 70(2): 167-172, October 1980.

To examine the separate and combined effects of alcohol and tobacco smoking on cortical functioning, the amplitude of the contingent negative variation (CNV) was studied during a simple reaction time task in nonsmokers (NS), tobacco-deprived smokers (DS), and nondeprived smokers (NDS) in sessions involving administration of four cigarettes and/or 0.65 g/kg ethyl alcohol. Computer analysis indicated that alcohol and combined alcohol plus tobacco significantly reduced the CNV amplitude in the NDS groups (NDS nontobacco,  $p < 0.05$ ; and NDS tobacco,  $p < 0.01$ ). Two subgroups of nonsmokers were identified, one showing large predrug CNV amplitudes and significant alcohol-induced reductions ( $23.5\mu V \pm 5.6$ ) and the other showing small predrug amplitudes and no change in CNV amplitude after alcohol ( $12.3\mu V \pm 8.6$ ,  $p < 0.05$ , two-tailed). No significant results were observed with alcohol, tobacco, or alcohol plus tobacco combined in tobacco-deprived smokers. The results are discussed in relation to previously reported studies which have indicated both synergistic and antagonistic interactions between alcohol and tobacco, and suggestions are forwarded regarding the experimental and clinical significance of tobacco-induced enhancement of CNV amplitude reduction by alcohol. (Auth. Abs. Mod.)

**81-0378.** Kurihara, H.; Tadokoro, S. Ratto no Sidman Kaihihano Karamita Etanoru to Nikochin no Koka. [Effects of Ethanol and Nicotine on Sidman-Type Avoidance Response in Rats.] *Arukuru Kenkyu* 14(3/4): 319-323, 1979, Japanese.

Male Wistar rats received ethanol and nicotine individually or in combination, and changes in Sidman type avoidance reactions were observed. With oral administration of 1.6-6.4 g/kg of ethanol, no changes were noted in the reaction rate and the rate of exposure to shock but, with an increase in dosage to 8 g/kg, the rate of exposure to shock was found to increase. With subcutaneous administration of nicotine alone, dosages less than 0.5 g/kg produced a dose-dependent increase in the reaction; and the larger dosages caused a reduction in the reaction and an increase in exposure to shock. With oral administration of dosages ranging from 0.078-2.5 mg/kg, a reverse V-shaped dose-response relationship was observed up to 0.31 mg/kg, but there was no change in the rate of exposure to shock. The effect of nicotine became rapidly evident, reaching a maximum within 30 min in both administration routes. When 1.6 or 3.2 g/kg of ethanol was combined with 0.78, 0.16, or 0.31 mg/kg of nicotine and administered orally, the dose-response relationship was observed in the changes in avoidance reactions. The effect of nicotine in enhancing the avoidance reactions was markedly antagonized with combined administration of ethanol. With combinations of 1.6 g/kg of ethanol and 0.16 mg/kg of nicotine, and 3.2 g/kg of ethanol and 0.078, 0.16, or 0.31 mg/kg of nicotine, reaction rates were produced which were considerably lower than those with nicotine administration alone. No marked changes were noted in the rate of exposure to shock.

**81-0379.** Latuff, A. A.; Smith, L. A.; Lang, W. J. Effects of Changing Dosage and Urinary pH in Rats Self-Administering Nicotine on a Food Delivery Schedule. *Pharmacology, Biochemistry and Behavior* 13(2): 209-213, August 1980.

The effects of different available dosage and of acidic and alkaline urinary pH have been investigated on the rates of self-administration of nicotine by rats on an FT60 food delivery schedule. Different groups of rats initially received one of three doses of nicotine (0.05, 0.1, and 0.25 mg/kg/infusion) contingent upon bar-pressing. The self-administration rates during an initial 6-day period of the three groups of rats were significantly ( $p < 0.05$ ) different from each other,  $26.1 \pm 3.2$  (SEM),  $15.4 \pm 1.5$ , and  $9.5 \pm 0.9$  at doses of 0.05, 0.1, and 0.25 mg/kg/infusion, respectively. However, once the rates of responding were established during the initial period, no significant changes occurred when the doses were changed in all three groups after each subsequent 6-day period. These rates of self-administration decreased when saline replaced the available nicotine solution after Day 18. The urinary pH of groups of rats was maintained alkaline (pH 9.0), acidic (pH 5.9), or normal (pH 6.7) by allowing them to drink sodium bicarbonate solution, ammonium chloride solution, or water, respectively. The self-administration rates during the initial periods of these three groups of rats were also significantly different from each other ( $4.7 \pm 0.66$ ,  $17.0 \pm 0.76$ , and  $9.4 \pm 1.11$ , respectively). In contrast, however, when the rates of responding were established at normal urinary pH during the initial period when water was available, no significant changes occurred when urinary pH was

subsequently changed in either an acidic or alkaline direction. The results suggest that the bar-pressing rates are dependent on the amount of nicotine available or present in plasma during the acquisition phase. Nevertheless, once the rate of bar-pressing is established on a food delivery schedule, it seems that the schedule exerts too powerful an effect on behavior for subsequent changes in nicotine levels to modify responding over the period of these experiments. (Auth. Abs.)

**81-0380.** Macdonald, C. M.; Boardman, L. E. An Isolated Rat Lung Perfusion System for Use in Tobacco Smoke Studies. *Journal of Pharmacological Methods* 3(2): 103-113, February 1980.

An isolated rat lung perfusion system has been developed for use in tobacco smoke studies. The lungs are ventilated by means of subatmospheric (negative) pressure produced through operation of an artificial thorax. The system enables standard respiratory conditions to be employed and so eliminates variations in animal breathing characteristics. The various tests of viability which have been carried out have shown that the preparations are viable for periods of at least 1 hr. To examine the deposition, absorption, and metabolism of nicotine by the isolated perfused rat lung, four perfusions were carried out in which the lungs were exposed to smoke (8 puffs) from a  $^{14}\text{C}$ -nicotine-labeled cigarette smoked to a standard butt length (mean radioactivity per cigarette 60.7  $\mu\text{Ci}$ ). It was demonstrated that transfer of  $^{14}\text{C}$ -nicotine from smoke to perfusate was rapid and linear over the period of smoke exposure and that first-pass metabolism of nicotine was of little significance. (Auth. Abs. Mod.)

**81-0381.** McNamara, P. J.; Slaughter, R. L.; Visco, J. P.; Elwood, C. M.; Siegel, J. H.; Lalka, D. Effect of Smoking on Binding of Lidocaine to Human Serum Proteins. (Letter). *Journal of Pharmaceutical Sciences* 69(6): 749-751, June 1980.

Serum samples from 16 volunteers (8 smokers and 8 nonsmokers) were obtained to study the effect of tobacco smoking on the binding of lidocaine to human serum proteins. Of the eight smokers, seven smoked 0.88-1.25 packs/day, and one smoked either one cigar or one pipeful of tobacco/day. The nonsmoking and smoking groups were fairly similar in regard to sex (both groups having six males and two females), age ( $45 \pm 20$  vs.  $42 \pm 12$  years, mean  $\pm$  SD), serum albumin concentration ( $4.9 \pm 0.5$  vs.  $4.7 \pm 0.3$  g/100 ml), concurrent medication (only diuretic therapy), and total serum protein concentration ( $7.5 \pm 0.3$  vs.  $7.2 \pm 0.4$  g/100 ml). Among the subjects, substantial variability was observed of lidocaine-free fraction values. The free fraction ranged from 0.208 to 0.342 (0.280 mean) at a final concentration of 1.4  $\mu\text{g/ml}$ ,  $0.258 \pm 0.039$  for smokers and  $0.307 \pm 0.030$  for nonsmokers ( $p < 0.02$ ). Several explanations for the increased protein binding of lidocaine in the serum of smokers are discussed.

**81-0382.** Medical Advisory Board of the Swedish Tobacco Company. *Symposium on the Effects of Nicotine on Nervous Functions. Acta Physiologica Scandinavica* (Supplementum 479): 1-56, 1980.

The Medical Advisory Board of the Swedish Tobacco Company (STC) held a symposium November 29, 1978, on the effects of nicotine on nervous functions. Participants were STC grant recipients and guest lecturers. Paper topics included cholinergic neuronal activity in the brain; mammalian metabolism of nicotine; postnatal central noradrenergic neuron development after neonatal nicotine administration; nicotine induced catecholamine turnover, and gonadotropin and thyroid-stimulating hormone inhibition by nicotine; single cell activity of nicotine in noradrenergic nucleus locus coeruleus; dopamine- $\beta$ -hydroxylase axonal transport; sympathetic vasoconstrictor tone in cerebrovascular bed; smoking and blood temperature during exercise; prostaglandin synthesis in rabbit kidney; and psychological effects of smoking.

**81-0383.** Miras-Portugal, M. T.; Galarza, A.; Diaz, J.; Santos-Ruiz, A. *Estudios Sobre la Liberación de Dopamina- $\beta$ -hidroxilasa por Nicotina. [Studies on the Release of Dopamine- $\beta$ -hydroxylase by Nicotine.] Revista Espanola de Fisiologia* 34(1): 9-13, March 1978, Spanish.

Comparative studies were made on the release of dopamine- $\beta$ -hydroxylase (DBH) by adrenal medullary slices after colinomimetic stimulation with acetylcholine, dimethylphenylpiperazine, or nicotine ( $1 \times 10^{-5}M$ ) in guinea pigs. Nicotine resulted in a 50 percent increase in DBH activity compared to acetylcholine. The in vivo effects of nicotine on the circulating plasma DBH levels were also tested in habitual and nonhabitual smokers after five cigarettes containing 2.5 mg nicotine had been smoked. For smokers, the maximum DBH activity in plasma was  $109 \pm 1.2$  percent of initial activity; for nonsmokers the maximum was  $113 \pm 1.1$  percent of initial activity. The rise of plasma enzyme activity may reflect the increased catecholamine release from adrenal and peripheral adrenergic nerves. (Auth. Abs. Mod.)

**81-0384.** Molina, C.; Aiache, J.-M.; Viallier, J. *Reactions Immunitaires au Tabac. [Immunological Reactions to Tobacco.] Nouvelle Presse Medicale* 9(42): 3171-3175, November 8, 1980, French.

Tobacco may act as an allergenic or immunogenic agent, the antigen being present in either leaves or smoke. It is capable of producing immediate hypersensitivity reactions with respiratory disorders or cardiovascular lesions through a mechanism involving interaction between basophils and IgE. It may also induce the production of IgG-type antibodies, the significance of which remains to be elucidated. Finally, tobacco interferes with cell-mediated (alveolar macrophages, lymphocytes) lung defense mechanisms in normal subjects or patients. Any interpretation of some pathological conditions

associated with tobacco should take these immunological reactions into account. (Auth. Abs.)

**81-0385.** Morris, P. D. *Cigarette Residues Affect Steroidogenesis in Cultured Y-1 Mouse Adrenal Tumor Cells.* Master's Thesis, North Texas State University, Denton, University Microfilms International 13-14566, December 1979, 37 pp.

This study (1) quantitatively compared steroid production in cultured Y-1 mouse adrenal tumor cells exposed to nonfiltered Camel and heavily filtered Carlton smoke-derived residues, and (2) localized the effects in the cell. Basal steroid production was increased by Camel residues but not by Carlton, while adrenocorticotrophic hormone stimulation was interfered with by both residues. Camel basal stimulation was comparable to that of cAMP, and was abolished by Cytochalasin D. The stimulation was also comparable to that of cholera toxin, which activates adenyl cyclase. Results indicate that residue components dissolve in the membrane stimulating adenyl cyclase at a point similar to or before that utilized by cholera toxin for its stimulating effect. (Auth. Abs.)

**81-0386.** Mucklow, J. C.; Fraser, H. S. *The Effects of Age and Smoking Upon Antipyrine Metabolism. British Journal of Clinical Pharmacology* 9(6): 613-614, June 1980.

The antipyrine clearance values were analyzed for 60 healthy white subjects, mean age 36.8 years, of whom 29 smoked 4-40 cigarettes/day. The difference in antipyrine clearance between men and women was not significant. On the whole, clearance in smokers ( $0.82 \pm 0.18$  ml min<sup>-1</sup> kg<sup>-1</sup>) was significantly faster than in nonsmokers ( $0.63 \pm 0.22$  ml min<sup>-1</sup> kg<sup>-1</sup>,  $p < 0.001$ ). The difference in clearance between smokers and nonsmokers, respectively, was more significant ( $p < 0.005$ ) in subjects aged  $\geq 40$  ( $0.80 \pm 0.19$ ;  $0.59 \pm 0.18$  ml min<sup>-1</sup> kg<sup>-1</sup>) than in those  $< 40$  ( $0.84 \pm 0.16$ ;  $0.68 \pm 0.25$  ml min<sup>-1</sup> kg<sup>-1</sup>,  $p < 0.05$ ). No significant correlation was found between age and clearance when examined by linear regression analysis taking into account smoking habit and sex. The conclusion that the stimulating effect of smoking upon antipyrine metabolism diminishes with age requires more evidence.

**81-0387.** Ogawa, S.; Shigeo, T.; Nobuichi, G.; Soetsu, F. *Danshi ni Okeru Nikochin Shigeki Niyoru Okishitoshin Bunpi no Hendo. [Oxytocin Release Induced by Nicotine in Male Subjects.] Horum to Rinsho* 27(12): 1399-1403, 1979, Japanese.

The effects of smoking and alcohol consumption on oxytocin secretion were studied in 7 women and 20 men. Subjects were allowed to smoke, given 100 ml of whisky, allowed free access to water, or subjected to a water intake restriction; and their plasma oxytocin content, plasma osmolality, and serum electrolyte levels were observed. The plasma oxytocin content increased significantly 5 min after smoking in the groups with free access to water and water restriction.

There was no correlation between the rate of increase of the plasma oxytocin content, changes of osmolality, and changes of serum electrolyte levels. The changes of the plasma oxytocin content caused by alcohol drinking showed a significant correlation with changes of plasma osmolality and serum sodium changes. In the alcohol group, the plasma oxytocin content was found to become significantly lower 5 min after smoking in 8 out of 9 subjects when compared with the group with a water intake restriction. Oxytocin secretion appears to be enhanced by stimulation of the central nervous system by nicotine or an emetic stimulation of the central nervous system, but suppressed by alcohol. It was also projected that oxytocin secretion is related to water-electrolyte metabolism.

**81-0388.** Peirce, T. H.; York, G. K.; Franti, C. E.; Cross, C. E. **Biochemical Effect of Ozone Exposure in Rats Exposed to Cigarette Smoke.** *Archives of Environmental Health* 31(6): 290-292, November-December 1976.

The effects of high-dose ozone exposure on pulmonary glucose-6-phosphate dehydrogenase (G-6-PD) activity in smoke-exposed rats is presented. Rats were exposed to three cigarettes/day for 35 days, under realistic conditions. Pulmonary G-6-PD activity in the exposed animals increased 27 percent over control values ( $p < 0.05$ ). Subsequent exposure to acute, high-dose ozone (3 ppm for 4 hrs) decreased the augmented G-6-PD activities to near normal levels, whereas ozone exposures in animals not exposed to cigarette smoke caused mild decreases in pulmonary G-6-PD activities. The importance of these findings with respect to the susceptibility of the smoker to oxidant exposures is unknown. (Auth. Abs. Mod.)

**81-0389.** Radojčić, B.; Vagaja, M.; Jovic, M.; Trnčević, M. **Vrednosti Nikotina u Urinu i C Vitamina u Serumu Radnika Duvanske Industrije—Nis.** [Values of Nicotine in Urine and Vitamin C in Serum of Workers in the Nis Tobacco Factory.] *Acta Medica Medianae* 18(4): 41-45, 1979, Serbo-Croatian.

Analytical data on nicotine and vitamin C contents were obtained for 109 occupationally exposed workers and 40 nonexposed workers (controls). There were 64 smokers and 45 nonsmokers in the group of workers exposed to nicotine, including 25 pregnant women workers. The average nicotine content of 24 hrs urine was found to be 2.14 mg/100 ml in nonsmokers and 5.47 mg/100 ml in smokers compared to 0.42 mg/100 ml in the controls. The differences between the nicotine-exposed and nonexposed workers were statistically significant. By comparison with the controls, the vitamin C content of serum in nicotine-exposed workers decreased significantly. Thus, a negative correlation was established between the nicotine values in urine and vitamin C values in serum. In the group of pregnant women, 40 percent had hypochromic anemia, 8 percent gestosis in the last 3-month period, 12 percent encountered a risk of abortion at the beginning of pregnancy, and 72 percent had a shorter

pregnancy. The weight of newborn infants was at the lower end of the normal range.

**81-0390.** Rosenberg, J.; Benowitz, N. L.; Jacob, P.; Wilson, K. M. **Disposition Kinetics and Effects of Intravenous Nicotine.** *Clinical Pharmacology and Therapeutics* 28(4): 517-522, October 1980.

The purposes of this study were (1) to define nicotine clearance with varied doses, (2) to characterize tolerance to nicotine-induced responses, and (3) to determine the effects of urinary pH on nicotine distribution. Nicotine was given intravenously to subjects ( $n=6$ ) during acid ( $\text{pH} < 5$ ) and alkaline ( $\text{pH} > 7$ ) urine conditions in doses and a dosing schedule designed to simulate cigarette smoking. The subjects were regular tobacco smokers (1-2 packs/day  $\geq 6$  months) and all reported use of  $\leq 2$  marijuana cigarettes/day. Total clearances were greater, terminal half-lives shorter, but volumes of distribution much the same in acid and alkaline urine conditions. The effect of urinary pH on total clearance was due entirely to changes in renal clearance, which accounted for 23 percent and 2 percent of total clearance in acid and alkaline urine conditions. Nicotine injections induced a sensation of arousal and increased heart rate and blood pressure over the short term, but with repeated injections tolerance to these effects developed rapidly. No differences in subjective or physiologic responses to intravenous nicotine were observed, and it is considered unlikely that the effects of smoking a cigarette differ as a function of urinary pH. (Auth. Abs. Mod.)

**81-0391.** Skerfving, S.; Korsgaard, R.; Stiksa, G.; Simonsson, B. G. **AHH Inducibility in Swedish Workers Exposed to Asbestos.** *IRCS Medical Science: Social and Occupational Medicine* 8(7/9): 532-533, July-September 1980.

Examination of aryl hydrocarbon hydroxylase (AHH) induction ratios in a cohort of asbestos-exposed subjects, and assessment of bronchogenic malignancy incidence as related to the degree of AHH induction in a prospective study were conducted by analyzing AHH activity in Swedish workers with an occupational history of asbestos exposure. There were 241 male subjects who were insulation, asbestos-cement factory, construction, and car brake workers. Of the subjects, 155 were smokers (most smoked  $> 15$  cigarettes/day) and 86 were nonsmokers. At the time of AHH assessment, none of the workers had either malignant disease or malignant tumor history. Venous blood samples were taken, and lymphocytes isolated by density centrifugation were stimulated with mitogens. Lymphoblasts induced or noninduced by 3-methylcholanthrene were used as controls. Enzyme activity was determined and AHH inducibility was expressed as the ratio of activity in the presence and absence of 3-methylcholanthrene. AHH induction ratios were also assessed in a reference population group of nonasbestos-exposed females ( $n=68$ ) and males ( $n=34$ ). Of this group, 42 were 5-40 cigarettes/day smokers. No significant differences in AHH

induction ratios could be demonstrated within or between the two groups. It is stated that shorter length of asbestos exposure (as compared to a prior study) might have affected the results.

**81-0392.** Smith, B. R.; Bend, J. R. **Prediction of Pulmonary Benzo(a)pyrene 4,5-Oxide Clearance: A Pharmacokinetic Analysis of Epoxide-Metabolizing Enzymes in Rabbit Lung.** *Journal of Pharmacology and Experimental Therapeutics* 214(3): 478-482, September 1980.

Clearance concepts initially developed to describe elimination of drugs and other substances by kidney and liver have been extended to calculate pulmonary extraction of circulating benzo(a)pyrene 4,5-oxide. Apparent kinetic parameters for pulmonary microsomal epoxide hydrolase and cytosolic glutathione S-transferase were estimated by using in vitro enzyme assays, and whole tissue  $V_{max}$  values of the two epoxide-metabolizing pathways were determined. From these data, a whole organ extraction ratio for benzo(a)pyrene 4,5-oxide was derived. The calculated extraction ratio (nearly one) was greater than, but in reasonable agreement with, the measured extraction ratio determined by using isolated perfused rabbit lungs exposed to circulating benzo(a)pyrene 4,5-oxide. The actual extraction ratio was  $0.64 \pm 0.04$ , which indicated that the rabbit lung was capable of removing a large percentage of circulating benzo(a)pyrene 4,5-oxide in a single pass through the organ. Therefore, the lung may play an important role in removing and biotransforming circulating arene oxides, as the entire cardiac output passes through the pulmonary capillary bed.

**81-0393.** Smith, L. A.; Lang, W. J. **Changes Occurring in Self Administration of Nicotine by Rats Over a 28-Day Period.** *Pharmacology, Biochemistry and Behavior* 13(2): 215-220, August 1980.

After rats at reduced body weight had established responding by lever pressing for nicotine injections under a food delivery schedule (FT60 sec) for 1-hr daily sessions for 14 days, the rate of responding was maintained over a second 14-day period even after removal of the schedule. However, the rate was not maintained by rats lever-pressing for normal saline without the schedule over the second 14-day period after self-administration had been established for nicotine under the schedule. Other rats maintained at reduced body weight were allowed to lever-press for nicotine over a 28-day period without the food delivery schedule. Their rate of self-administration increased from initially low levels until at the end of the 28-day period the rate had reached that of rats self-administering nicotine adjunctive to the food delivery schedule throughout the same period. Without the schedule, rats at reduced body weight self-administering normal saline or rats at normal body weight self-administering nicotine, continued to lever-press only at very low rates throughout the 28-day period. It is suggested that rats maintain self-administration of nicotine if the behavior can be established for a

critical intake of nicotine over a critical period of time. The food delivery schedule appears only to hasten the establishment of the behavior but is not essential for self-administration of nicotine by rats. (Auth. Abs.)

**81-0394.** Sprince, H.; Parker, C. M.; Smith, G. G. **L-Ascorbic Acid in Alcoholism and Smoking: Protection Against Acetaldehyde Toxicity as an Experimental Model.** *International Journal for Vitamin and Nutrition Research* (Supplement 16): 185-217, 1977.

An updated review of literature evidence with new original data is presented indicating that L-ascorbic acid in high oral doses may act as a protectant against the chronic body insult of certain toxicants associated with heavy drinking and heavy smoking. Seven such toxicants are enumerated and discussed. They are: ethanol, acetaldehyde, nicotine, carbon monoxide, *N*-nitroso compounds, cadmium, and polynuclear hydrocarbons. A number of these toxicants (e.g., ethanol, acetaldehyde, nicotine, cadmium) are known to increase the tissue release and urinary excretion of catecholamines and corticosteroids. The increased release and excretion of these stress hormones are also known to occur with heavy drinking and heavy smoking and have been associated with adverse cardiovascular, respiratory, and nervous system effects. The possible role of L-ascorbic acid as a protectant against these adverse effects by regulating (normalizing) catecholamine and corticosteroid activity is discussed. Using acetaldehyde as a representative toxicant for an experimental model in rats, new experimental data of protection against acetaldehyde toxicity and lethality by high oral doses of L-ascorbic acid are reported. Protectant activity of L-ascorbic acid was found to be dose-related. Also, protectant activity could be enhanced by the combination of L-ascorbic acid with (a) certain sulfur compounds (e.g., cysteine) and (b) certain anti-adrenergic drugs (e.g., reserpine, phenoxybenzamine, propranolol). Results with the latter combination suggest that L-ascorbic acid in high doses can act as an adjunctive drug with catecholamine-regulating agents, an observation of potential biomedical importance. It is suggested that as a protectant against heavy drinking and heavy smoking, L-ascorbic acid could act directly against certain toxicants per se or indirectly against the excessive release of catecholamines and corticosteroids induced by these toxicants. (Auth. Abs.)

nicotine (1 mg/kg) once a day for 1 or 10 days. Sham-exposed rats received identical volumes of saline only. When the rats were exposed to nicotine only once and 50 ng of A I was injected as a bolus into the isolated perfused lungs about 24 hrs after nicotine exposure, there was no difference in the activation of A I to A II when compared to the lungs from sham-treated or control animals. When the nicotine exposure was repeated during 10 consecutive days, there was an increased formation of A II from A I when compared to control rats ( $2p < 0.05$ ). There was, however, no difference between the lungs from 10-day sham- and 10-day nicotine-exposed rats. This suggests that the increased formation of A II may be due at least partly to factors other than nicotine. When A II was injected into the lungs instead of A I, it passed mostly unchanged through the lungs. Exposure of rats to nicotine for 1 to 10 days did not change the survival of A II when compared to sham-exposed rats. In the lungs from 10-day nicotine-exposed rats there was, however, a trend ( $2p < 0.1$ ) for increased survival of A II in comparison to the lungs from control rats. About 95 percent from PGE<sub>2</sub> (250-500 ng) was inactivated during one passage through the pulmonary circulation, and exposure of rats to nicotine for 1 or 10 days did not change the ability of their lungs to inactivate PGE<sub>2</sub>.

**81-0396.** Turner, J.A.M.; Sillett, R. W.; McNicol, M. W. *The Inhaling Habits of Pipe Smokers. British Journal of Diseases of the Chest* 75(1): 71-76, January 1981.

Carboxyhemoglobin and plasma nicotine levels were compared in five primary and five secondary pipe (i.e., previous cigarette smoking) smokers over the course of 1 hour's pipe smoking. The primary pipe smokers had low presmoking nicotine and carboxyhemoglobin levels with a small increase after smoking (carboxyhemoglobin 1.1 percent rising to 1.26 percent and nicotine 77 nmol/l rising to 33.9 nmol/l). Secondary pipe smokers had a higher presmoking carboxyhemoglobin and nicotine level with a significant rise during smoking (carboxyhemoglobin 3.0 percent rising to 4.3 percent, plasma nicotine 743 nmol/l rising to 215.8 nmol/l), indicating significant inhalation and absorption of carbon monoxide and nicotine. These results indicate that primary pipe smokers, who have never smoked cigarettes, do not inhale and absorb very little nicotine. Secondary pipe smokers do not lose their habit of inhaling and absorb large amounts of nicotine and carbon monoxide. They may not share the lower health hazard of the primary pipe smoker. (Auth. Abs.)

**81-0397.** Uppal, R.; Garg, S. K.; Sharma, P. R.; Nair, C. R.; Chaudhury, R. R. *Cigarette Smokers-Accelerated Antipyrine Metabolism. Bulletin of the Post-Graduate Institute of Medical Education and Research, Chandigarh* 13(2): 102-104, 1979.

The results of a study concerning the effect of chronic cigarette smoking on plasma antipyrine half-life are presented. The study group was composed of 10 male smokers ( $\geq 10$

cigarettes/day for  $\geq 2$  years) aged 21-35 and 9 male non-smokers aged 20-38. Each subject received an oral dose of 18 mg/kg antipyrine and after an overnight fast, blood samples were collected at 2, 4, 8, and 12 hours and assayed for antipyrine. The mean antipyrine half-life (hours) in the smokers ( $6.27 \pm 1.95$ ) was significantly less than that in the nonsmokers ( $9.25 \pm 2.88$ ),  $p < 0.05$ . It is stated that these results have implications in drug therapy, where smokers might require either higher or more frequent drug dosages than nonsmokers.

**81-0398.** Waldbillig, R. J. *Suppressive Effects of Intraperitoneal and Intraventricular Injections of Nicotine on Muricide and Shock-Induced Attack on Conspecifics. Pharmacology, Biochemistry and Behavior* 12(4): 619-623, April 1980.

Rats were used to investigate the effect of nicotine on mouse-killing and foot shock-induced attack on conspecifics. It was found that intraperitoneal injections of nicotine (100-1,000  $\mu\text{g/kg}$ ) suppressed mouse-killing in a dose-dependent manner. The suppression of mouse-killing by nicotine was not blocked by hexamethonium (30 mg/kg), a peripheral nicotinic receptor blocking agent. Mecamylamine (30 mg/kg), a nicotinic blocking agent with central effects, did reduce the inhibition of attack produced by nicotine. Both intraperitoneal and intraventricular injections of nicotine suppressed shock-induced attack on conspecifics. Shock-elicited flinch, vocalization, and escape were not influenced by nicotine injections. These findings give further support to the view that muscarinic and nicotinic compounds produce antagonistic effects on certain types of attack behavior. (Auth. Abs.)

**81-0399.** Wennmalm, A. *Nicotine Inhibits Hypoxia- and Arachidonate-Induced Release of Prostacyclin-Like Activity in Rabbit Hearts. British Journal of Pharmacology* 69(4): 545-549, August 1980.

Rabbit hearts were perfused and the interstitial effluent content of platelet antiaggregatory activity (prostacyclin-like activity) was assayed at regular intervals. Perfusion was performed with a solution containing 5 percent carbon dioxide (CO<sub>2</sub>) in oxygen (O<sub>2</sub>). At regular intervals it was changed to a solution containing 12 percent O<sub>2</sub> and 5 percent CO<sub>2</sub> in nitrogen. Alternatively, perfusion with 5 percent CO<sub>2</sub> in O<sub>2</sub> was maintained during the entire experiment and sodium arachidonate was infused (5-15  $\mu\text{g/min}$ ) at intervals. Under the basal conditions no efflux of prostacyclin-like activity was observed in the interstitial cardiac effluent, but both perfusion with a hypoxic solution and infusion of arachidonate induced such release. Nicotine ( $5 \times 10^{-3}$  M) in the solution perfusing the heart markedly inhibited the efflux of prostacyclin-like activity into the cardiac interstitial effluent, induced by hypoxia or by infusion of arachidonate. It is suggested that nicotine counteracts the formation of prostacyclin-like activity in the rabbit heart by interfering with the enzymatic conversion of arachidonate to prostacyclin. (Auth. Abs.)

See also, 81-0356, 81-0422, 81-0467, 81-0471, 81-0483, 81-0549, 81-0578

## MORTALITY AND MORBIDITY

**81-0400.** Cochrane, A. L.; Moore, F. A 20-Year Follow-Up of a Population Sample (Aged 25-34) Including Coal-Miners and Foundry Workers in Staveley, Derbyshire. *British Journal of Industrial Medicine* 37(3): 230-233, August 1980.

A 20-year followup of a population sample of men aged 25-34 has been completed in Staveley, Derbyshire. The sample was based on a private census, with brief industrial histories, that enabled four groups to be established: nondusty, pure coal-mining, pure foundry, and other and mixed. The similarity of the mortality rates of the nondusty, coal-mining, and foundry groups is satisfactory, but there is, however, a surprisingly high mortality rate in the other and mixed group. This could not be explained on the basis of their industrial exposure, and only to a very limited extent by their smoking habits. The highest percentage of heavy ( $\geq 14$  cigarettes/day) smokers (48.6) was found in the other and mixed group. Corresponding percentages in the nondusty, pure coal-mining, and pure foundry groups were 36.0, 40.4, and 35.2. It is suggested that there is a small group of uncooperative men, overweight for their height and heavy smokers, who self-select themselves into jobs that are classified in a study such as this as other and mixed. (Auth. Abs. Mod.)

**81-0401.** Lannerstad, O. Morbidity Related to Smoking and Other Risk Factors. A Population Study of Disability Pension, Hospital Care and Sickness Benefit Days Among Middle-Aged Men in Malmö, Sweden. *Scandinavian Journal of Social Medicine* 8(1): 25-31, 1980.

In 1969 a cohort of 703 men born in 1914 was screened to determine the prevalence of cardiovascular and pulmonary diseases among middle-aged men. Smoking habits and other cardiovascular risk factors were registered. Hypertension was treated. The disability pension rate among nonsmokers ( $n=108$ ) was considerably lower than that for smokers ( $n=436$ ), i.e., about 1 vs. 9 percent, respectively. Also the proportion of individuals who had been admitted to the hospital and the proportion of individuals who had reported sick was lower in nonsmokers than in smokers ( $p<0.01$  and  $p<0.05$ , respectively). The ex-smokers showed an intermediate position both in terms of disability pension rate and in proportion of individuals admitted to the hospital. High systolic blood pressure, high cholesterol level, and high triglyceride values in 1969 were not associated with increased disability pension rate, hospitalization rate, or with increased sick leave. (Auth. Abs.)

**81-0402.** Liddell, F.D.K.; McDonald, J. C. Radiological Findings as Predictors of Mortality in Quebec Asbestos Workers. *British Journal of Industrial Medicine* 37(3): 257-267, August 1980.

Two cohorts of chrysotile miners and millers in Quebec were selected to study the extent to which chest radiographs taken while still employed predict mortality. The paper presents mainly findings in much the larger cohort, which consisted of 4,559 men (two-thirds past workers) whose latest radiograph had been assessed by 1 of 6 experienced readers into what became the UICC/Cincinnati (U/C) classification; by the end of 1975 there had been 1,543 deaths in this cohort. The findings were generally confirmed in the other cohort, comprising 988 current male workers, who had been examined in 1967-1968 by questionnaires on respiratory symptoms and smoking and by lung function tests, and for whom all 6 readers had assessed their 1966 radiographs into the U/C classification. By the end of 1975, 130 men had died. Men with any radiographic abnormality, heavy dust exposure, or a history of cigarette smoking had relative risks (RRs) of total mortality greater than unity. The RRs of mortality from various diseases related to cigarette smoking were as follows: pneumoconiosis, 1.11; lung cancer, 3.35; respiratory tuberculosis, 1.85; other respiratory diseases, 1.39; heart diseases, 1.78; and all other known causes, 1.46. Death from pneumoconiosis was associated with small parenchymal opacities, usually irregular, of profusion 1/1 or more, and with heavy dust exposure but not with smoking. Most who died from lung cancer had smoked cigarettes, or had been heavily exposed to dust, or both. Small parenchymal opacities were present in most but not all the excess deaths due to lung cancer. Deaths from other malignant diseases showed no consistent dust or X-ray patterns. RRs of deaths from most other causes were raised for certain radiographic features. Failures in forecasting mortality were primarily due to deaths in which asbestos-related disease was not the primary cause but may have been a contributing factor. The results provide support for the use of the chest radiograph for surveillance of asbestos workers, and for environmental monitoring. Its protective value for individual workers, however, is limited to the extent that radiological progression continues after withdrawal from exposure, and by the carcinogenic risk associated with dust already retained. (Auth. Abs. Mod.)

**81-0403.** Schroll, M. Smoking Habits in the Glostrup Population of Men and Women, Born in 1914. Implications for Health, Evaluated From Ten-Year Mortality, Incidence of Cardiovascular Manifestations and Pulmonary Function, 1964-1974. *Acta Medica Scandinavica* 208(4): 245-256, 1980.



Of a total population of 514 men and 461 women, born in 1914, from seven municipalities in Copenhagen County, 87 percent were examined in 1964 and 1974. Smoking habits (inhalation, kind of tobacco, amount, duration of smoking, and changes over a decade) have been described in this age-specific, general population. The health implications were examined. Tobacco consumption in this population was the most important risk factor for overall mortality, cardiovascular manifestations, peripheral arterial disease, decline in pulmonary function, and symptoms of ulcer. The results are consistent with other prospective epidemiological studies. The relative risk of death, of fatal and nonfatal cardiovascular manifestations, and of decline in pulmonary function increased gradually with the amount of tobacco smoked. Inhalation roughly doubled the risk. The excess risk for pipe/cheroot smokers was less than that for cigarette smokers. Ex-smokers reduced their risk about 50 percent. The risk associated with smoking was independent of other factors. The excess risk attributable to smoking was as great in women as in men, but the community problem of smoking-related diseases was most pronounced in men, among whom smoking habits are more widespread and morbidity is higher. The results from the 1914 population study suggest that almost one-third of all deaths and heart attacks in middle-aged Danes might have been avoided, if all 50-year-olds had given up smoking. (Auth. Abs.)

**81-0404.** Tietze, C.; Lewit, S. **Life Risks Associated With Reversible Methods of Fertility Regulation.** *International Journal of Gynaecology and Obstetrics* 16(6): 456-459, 1978-1979.

Based on a computer model, this report attempts to quantify the risk to life associated with reversible methods of fertility regulation, compared to those of uncontrolled childbearing. Among young women under 30 years of age, with the exception of pill-takers who smoke, the total risk to life associated with each of the major methods of fertility control used alone is about equal, on the order of 1-2/100,000 women/year, significantly lower than the birth-related risk to life without fertility regulation. Pill-takers who smoke approach that risk in their late twenties. Beyond age 30 the risk to life (which is almost entirely method-related) increases rapidly for pill-takers, especially those who smoke (30-34 years, 12.2/100,000 as compared to 3.4/100,000 for nonsmokers). After age 40, it is much higher in the latter group (60.9/100,000) than the risk experienced by women using neither contraception nor abortion (61.3 vs. 4.0 per 100,000, respectively). For all other methods, the risk remains virtually constant or (in the case of those using barrier methods without abortion backup) increases moderately, but remains far below the level of mortality associated with complications of pregnancy and childbirth without fertility control. At all ages, the lowest level of mortality by far is achieved by a combined regimen, i.e., use of barrier contraceptives and recourse to early abortion in case of failure. (Auth. Abs. Mod.)

See also, 81-0426, 81-0486, 81-0516, 81-0565

## NEOPLASTIC DISEASES

**81-0405.** Amicarella, G.; Conti, F.; Zazzaretta, C. **Studio Clinico-Statistico Delle Neoplasie Polmonari Primitive nei Soggetti di eta Inferiore ai 40 Anni.** [Clinical-Statistical Study on Primary Lung Carcinoma in People Under 40 Years of Age.] *Polichinco* 85(6): 403-410, November-December 1978, Italian.

Using clinical data from 360 cases occurring in the period 1965-74, a personal statistical analysis was obtained from a group of 25 subjects under 40 years of age who had primary pulmonary carcinoma. The following information was collected: incidence, sex, exposure to cigarette smoking, clinical onset, course of the disease, and histology. There were 15 smokers among the subjects; 4 were heavy (>20 cigarettes/day) smokers. Results were as follows: incidence, 6.9 percent of the total; and male-female ratio 4:1. A relation between cigarette smoking and tumor incidence was not positively demonstrated because of the short duration of cigarette smoking. The clinical course was shown to be more serious and faster than bronchial carcinoma in older subjects;

the higher histological incidence of adenocarcinomatous cases confirmed the particular clinical course and the worse prognosis in younger subjects. (Auth. Abs. Mod.)

**81-0406.** Anthony, H. M.; Madsen, K. E.; Mason, M. K.; Templeman, G. H. **Lung Cancer, Immune Status, Histopathology and Smoking. Is Oat Cell Carcinoma Lymphodependent?** *British Journal of Diseases of the Chest* 75(1): 40-54, January 1981.

Life table analysis and partial correlation analysis have been used to examine the importance and interaction of those factors reported to affect prognosis in lung cancer in a group of men taking part in a recent trial. In patients with squamous carcinoma the lymphocyte count at diagnosis was a genuine correlate of survival, those with higher counts living longer. Patients who had smoked more heavily were younger when their tumors were found, had better differentiated carcinomas and longer survival. Those with poorer differentiation had

weaker skin test reactivity, but the expected shorter survival was seen only when controls for symptom pattern history and resectability were applied. These data could be explained by control of tumor extension by cell-mediated immunity, earlier induction of better differentiated tumors in heavier smokers, more insidious onset of symptoms in those with better differentiated tumors, and the depression of cell-mediated immunity by poorly differentiated tumors. In contrast, the longer survivors among patients with oat cell carcinoma had lower lymphocyte and monocyte counts at the time of diagnosis. Lymphocyte and monocyte counts contributed independently to survival in keeping with oat cell carcinoma being lymphodependent and resistant to immune cytolysis. (Auth. Abs.)

**81-0407.** Chameaud, J.; Cogema, R. P.; Chretien, J.; Masse, R.; Lafuma, J. *Etude Experimentale de l'Action Combinee de la Fumee de Cigarettes et du Depot Actif du Radon-222.* [Experimental Study of the Combined Effect of Cigarette Smoke and an Active Burden of Radon-222.] In: *Late Biological Effects of Ionizing Radiation*. Volume II. International Atomic Energy Agency, Vienna, 1978, pp. 429-436, French.

Previous studies on the carcinogenic effect of radon-222 derivatives have yielded accurate relationships, for each radon dose, between the dose value and the frequencies and latency times of lung cancers. In the present work, 100 rats were subjected, over 1.5 months, to a total dose of 3,600 WLM, chosen because it corresponds to a 30 percent occurrence of cancers. Of these animals, 50 then inhaled cigarette smoke during 50 10-min sessions/week. The total time for these inhalations was 350 hours spread over about 6 months. In the "radon" group (50 rats), 17 animals were found to have lung cancer. In the "radon + tobacco" group (50 rats), 32 cancers were observed; moreover, the tumors in this group were much more extensive, multifocal, and invasive. Animals subjected to cigarette smoke alone have never shown lung cancer. The effect of tobacco as a cofactor in carcinogenesis has thus been verified experimentally, although inhaled cigarette smoke alone is not carcinogenic in rats. (Auth. Abs.)

**81-0408.** Daniell, H. W. **Estrogen Receptors, Breast Cancer, and Smoking. (Letter).** *New England Journal of Medicine* 302(26): 1478, June 26, 1980.

Because smoking has been implicated in accelerating the progression of diseases, such as premature menopause, osteoporosis, and infertility, which are aggravated by estrogen deficiency, a study was undertaken to compare the hormone-binding status of malignant breast tissues obtained from smoking and nonsmoking mastectomy patients ( $n=78$ ). It was found that tumors were more frequently estrogen-receptor positive in nonsmokers than in smokers (68 vs. 39 percent,  $p<0.03$ ), and more progesterone-receptor positive in nonsmokers than in smokers in the nine tumors tested (in 8/12

nonsmokers and in 1/12 smokers,  $p<0.03$ ). Further, lymph node metastases were more frequent among smokers than nonsmokers (50 vs. 32 percent,  $p<0.1$ ). It is stated that there is a need to determine both whether smoking and hormone-receptor status are parallel or independent prognostic factors, and whether the effect smoking has on hormone-binding in malignant tissue is temporary or permanent.

**81-0409.** De Poitiers, W.; Lord, P. W.; Biles, B.; Whimster, W. F. **Bronchial Gland Histochemistry in Lungs Removed for Cancer.** *Thorax* 35(7): 546-551, July 1980.

The bronchial glands in the main bronchus and succeeding generations of the inferior lingular airway have been studied in 10 left lungs removed surgically for lung cancer. The ratios of sulphated to sialidated mucin found did not coincide with previous results and suggested that this is not a useful measurement for the assessment of cigarette smoke or other inhaled pollutants. The total acid mucin, measured as a percentage of bronchial gland present, showed the same trends as previously reported—namely, more storage of mucin in nonsmokers and in more distal generations. The large dose of cigarettes smoked (average 34 cigarettes/day) by the patients in the present series was reflected by a significantly lower level of acid mucin storage ( $p<0.001$ ), and this measure is potentially useful for assessing exposure to cigarette smoke and other inhaled pollutants. The percentages of mucous and serous cells in successive generations of an airway are recorded for the first time in these smokers and in a "normal" post mortem specimen. The results suggest that similar proportions of mucous and serous cells exist in both large and small airways, but with a tendency in the smokers for more mucous cells in the more distal generations. (Auth. Abs. Mod.)

**81-0410.** Ganz, P. A.; Vernon, S. E.; Preston, D.; Coulson, W. F. **Lung Cancer in Younger Patients.** *Western Journal of Medicine* 133(5): 373-378, November 1980.

The clinical and pathological findings in 96 cases of bronchogenic cancer in patients  $\leq 40$  years seen between 1956 and 1976 have been reviewed. The review is in agreement with the literature in finding a higher proportion of women among the younger patients with lung cancer, as well as a relatively low incidence of squamous cell carcinoma in this population. It was confirmed that lung cancer is largely a smoke-related neoplasm among younger patients. Of the 96 patients, 88 had available smoking histories and 90 percent were smokers (mean 29 cigarettes/day). Among the smokers 32 percent smoked  $\geq 40$  cigarettes/day. There was also a correlation between the patients' age and the number of years they smoked (mean 18 years). No significant improvement in length of survival among our patients that could be attributed to new therapeutic modalities (chemotherapy and radiotherapy) could be found, reflecting the fact that cure of this disease is related to surgical resection. In addition, by using comparative data from tumor registries, no significant difference in

survival of younger patients compared with that of the general population of patients with lung cancer could be found. (Auth. Abs. Mod.)

**81-0411.** Gebauer, C. Hamartochondrome der Lungen und Bronchien. [Hamartochondromas of the Lungs and Bronchi.] *Praxis und Klinik der Pneumologie* 34(11): 641-650, November 1980, German.

Histomorphological, statistical, clinical, and etiological studies from German, British, and U.S. sources are reviewed. In one etiological study, pulmonary hamartochondromas are correlated with all carcinomas except adenocarcinoma with respect to cigarette smoking. In a sample of 104 patients with hamartochondroma of the lung, 80 percent were men of whom 91.4 percent were smokers and 68.8 percent smoked more than 10 cigarettes/day (heavy smokers). Of 192 patients with lung carcinoma, 90.6 percent were men of whom 89.7 percent were smokers and 76.5 percent heavy smokers. The data indicate that male heavy smokers with hamartochondroma of the lung are likely to develop malignant tumors, often with chronic bronchitis as secondary disease.

**81-0412.** Hinds, M. W.; Kolonel, L. N.; Lee, J.; Hirohata, T. Associations Between Cancer Incidence and Alcohol/Cigarette Consumption Among Five Ethnic Groups in Hawaii. *British Journal of Cancer* 41(6): 929-940, June 1980.

The average annual age-adjusted incidence rates of cancer for 15 sites were determined for 10 ethnic-sex groups (Japanese, Caucasian, Filipino, Chinese, and Hawaiian males and females) in Hawaii. Consumption rates for cigarettes, beer, wine, and hard liquor were also determined for the same 10 groups based on personal interview of a sample of 9,920 individuals. Covariance analysis was used to adjust each exposure variable for the other three, and the cancer incidence rates were then linearly regressed on these covariance-adjusted consumption rates. Statistically significant regression coefficients were found for cancer of the tongue/mouth (0.97), pharynx (0.84), larynx (1.44), pancreas (0.91), lung (8.68), kidney (1.06), and bladder (2.50) regressed on cigarette consumption ( $p < 0.05$ ). Eight cancer sites, including tongue/mouth, pharynx, larynx, esophagus, stomach, pancreas, lung, and kidney, had significant positive regression coefficients for beer consumption which could not be explained by outlying values on the scattergram. Multiple regression analysis with sex, cigarettes, and alcoholic beverage as independent variables consistently found sex to be least important in determining cancer risk. This study supports the hypothesis that beer consumption may play a role in cancer risk for several sites. It is suggested that future studies of alcoholic beverages and cancer should examine not only types of alcoholic beverages, but individual brands of each type in an attempt to identify cancer risk due to carcinogens in only certain brands. (Auth. Abs. Mod.)

**81-0413.** Hirao, F.; Nishikawa, H.; Yoshimoto, T.; Sakatani, M.; Namba, M.; Ogura, T.; Yamamura, Y. Production of Lung Cancer and Amyloidosis in Rabbits by Intrabronchial Instillation of Benzo(a)pyrene. *Gann* 71(2): 197-205, April 1980.

The carcinogenic activity of benzo(a)pyrene alone was evaluated by induction of lung cancer in rabbits. Rabbits received intrabronchial instillation of 5 or 40 mg of benzo(a)pyrene suspended in sterile saline every 10 to 14 days. Cancer was noted in approximately 42 percent of the rabbits that survived for more than 300 days. These cancers included squamous cell carcinoma, adenocarcinoma, undifferentiated cell carcinoma, fibrosarcoma, and mixed type. In the same experiment amyloidosis was seen in 16 rabbits.

**81-0414.** Indian Council of Medical Research Bulletin. Reverse Smoking and Carcinoma of the Hard Palate in Coastal Andhra. *Indian Council of Medical Research Bulletin* 7(1): 1-4, January 1977.

Studies were undertaken in coastal Andhra Pradesh to ascertain (1) the frequency of reverse smoking of chuttas and other smoking habits, and tobacco and pan chewing; (2) the changes seen in the palates of reverse smokers and other smokers; (3) the frequency of hard palate carcinoma and its relation to reverse smoking; (4) the relationship between reverse smoking and other carcinomas—oral, oropharyngeal, pharyngeal, laryngeal, and esophageal; and (5) the possible explanation for the localization of hard palate carcinoma to the posterior half of the palate. A total of 6,455 men and 8,845 women (aged  $\geq 20$  years) were studied and examined for smoking habit (i.e., bidi, cigarettes, chutta) and hard palate changes. About 25 percent of the males and 50 percent of the females indulged in reverse smoking. Of these subjects, 70-80 percent had stomatitis nicotina lesions of the palate, while of the conventional chutta smokers only 34-40 percent showed such changes. Although 3.5 percent and 4.0 percent of the males were cigarette or bidi smokers, respectively, stomatitis nicotina was present in 17 and 21 percent, respectively. A total of 356 cases of hard palate cancer patients were studied. Women constituted 74 percent of the cases while 36 percent were men. More women  $< 40$  years had hard palate cancer which may have been due to the fact that women were more persistently reverse smokers of chutta than men (27.91 vs. 10.44 percent, respectively). The risk of developing hard palate cancer in women who reverse-smoked chuttas was 132 times greater than in nonreverse smokers. Reverse smoking was not of risk for laryngeal, pharyngeal, esophageal, and nasopharyngeal carcinoma development. Statistical analysis showed changing from reverse to conventional smoking could result in an 80 percent reduction in risk of developing hard palate carcinoma.

**81-0415.** Johnston-Early, A.; Cohen, M. H.; Minna, J. D.; Paxton, L. M.; Fossieck, B. E., Jr.; Ihde, D. C.; Bunn, P. A., Jr.; Matthews, M. J.; Makuch, R. Smoking Abstinence and

**Small Cell Lung Cancer Survival. An Association.** *Journal of the American Medical Association* 244(19): 2175-2179, November 14, 1980.

The prognostic implications of cigarette smoking were investigated in 112 patients with small cell lung cancer. Twenty had stopped smoking permanently before diagnosis (NS-Prior), 35 had stopped at diagnosis (NS-Dx), and 57 patients continued smoking (S). Therapies included chemotherapy alone or with radiation therapy, with or without thymosin fraction V. The survival difference among the three groups was statistically significant ( $p=0.035$ ). The NS-Prior patients had the best survival (Failure/Total=13/20), followed by NS-Dx patients (22/35), and finally S patients (45/57). No S patient has survived, disease-free, more than 96 weeks, while three NS-Prior and three NS-Dx patients were disease-free 103-220 weeks after start of treatment. Thymosin, 60 mg/sq m, yielded survival benefits for the S group only. Continuation of smoking during the treatment of small cell lung cancer was associated with a poor prognosis, while discontinuation of smoking, even at diagnosis, had beneficial effects on survival. (Auth. Abs. Mod.)

**81-0416.** Keller, A. Z. **The Epidemiology of Esophageal Cancer in the West.** *Preventive Medicine* 9(5): 607-612, September 1980.

Incidence rates, relative frequencies, and relative risk measures are compared for sites of esophageal, oral, and pharyngeal cancer with regard to race, tobacco smoked, alcoholic beverage consumption, and combinations of these factors. These data are adapted from The Third National Cancer Survey and the 171 Veterans Administration hospitals in the United States. It was found that blacks and whites of the same sex are at similar risks of oral and pharyngeal cancers, but that blacks of either sex are at inordinately high risks of esophageal cancer (incidence rates/100,000 were 9.7 for blacks as compared with 2.8 for whites). Both smoked tobacco and alcoholic beverages are associated with an increased risk of cancer of oral, pharyngeal, and esophageal sites. In 586 pairs of male oral and pharyngeal cancer patients who smoked, matched for age and alcohol consumption, the relative risk of oral and pharyngeal cancer was 1.4 ( $p<0.01$ ), and in 304 pairs of male esophageal cancer patients who smoked, matched for age, alcohol consumption, and race, the relative risk of esophageal cancer was 1.1 ( $0.5<p<0.7$ ). Moreover, only alcoholic beverages are clearly associated independently with these cancers, and blacks drink significantly more whiskey than do whites. These findings suggest that behavioral characteristics associated with racial differences in drinking patterns might explain black/white differences in morbidity and mortality ascribed to cancer of the esophagus. (Auth. Abs. Mod.)

**81-0417.** Kolonel, L. N. **Smoking and Drinking Patterns Among Different Ethnic Groups in Hawaii.** In: *Second Symposium on Epidemiology and Cancer Registries in the Pacific*

*Basin*. National Cancer Institute Monograph 53, U.S. Department of Health, Education, and Welfare, NIH Publication No. 79-1864, November 1979, pp. 81-87.

Ethnic differences in smoking and drinking habits among the five major ethnic groups in Hawaii (Caucasians, Japanese, Chinese, Filipinos, and Hawaiians) were examined by means of questionnaire data obtained from a representative sample of 8,636 Hawaii residents. For men, lifetime cigarette use was greatest among Caucasians and lowest among Chinese and Filipinos. For women, smoking cigarettes was highest among Caucasians and lowest among Chinese. Although overall smoking patterns showed some relationship to lung cancer incidence, the observed rates could not be fully explained. For example, Hawaiian and Japanese men have comparable cigarette use (approximately 22 pack-years), yet the lung cancer incidence rate was twice as high among the Hawaiians as compared to the Japanese (70 vs. 30 per 100,000 population). Beer consumption was greatest among Hawaiians of both sexes and least among the Chinese; most consumers of spirits (hard liquor) were Caucasian. Total alcohol consumption was similar among Hawaiians and Caucasians and was considerably greater than among the other three ethnic groups. Alcohol consumption patterns among men did not correlate well with esophageal cancer incidence, even when the analyses were restricted to smokers; among women, however, the correlation was high. For those sex- and ethnic-specific groups whose alcohol consumption was generally low, there was a negative association of amount consumed with mean annual family income. For the groups with higher proportions of drinkers, mean annual family income was higher among those who drank moderately ( $p<5$  oz/week) than among those who either drank more heavily or not at all. (Auth. Abs. Mod.)

**81-0418.** Lyon, J. L.; Gardner, J. W.; West, D. W. **Cancer Incidence in Mormons and Non-Mormons in Utah During 1967-75.** *Journal of the National Cancer Institute* 65(5): 1055-1061, November 1980.

Data from the Utah Cancer Registry were used to compare cancer incidence in Mormons and non-Mormons in Utah for the period 1967-75. Church membership was identified for 97.8 percent of the 20,379 cases in Utah by a search of the central membership files of the Mormon Church. Sites associated with smoking (lung, larynx, pharynx, oral cavity, esophagus, and urinary bladder) showed an incidence in Mormons at 54 percent below that of non-Mormons. Between Mormons and non-Mormons there was a 69 percent difference in esophageal and laryngeal cancer incidence, a 38 percent difference in bladder cancer incidence, and a 55 percent difference in lung cancer incidence. Rates of cancers of the breast, cervix, and ovary were low in Mormon women; the rate for cervical cancer was about one-half of that observed in non-Mormons. Cancers of the stomach, colon-rectum, and pancreas were about one-third lower in Mormons than in others who are not members of this religious group. Most of the differences seen in cancer incidence can be

explained by Mormon teachings regarding sexual activity and alcohol and tobacco use, but some differences (e.g., colon and stomach) remain unexplained (Auth. Abs. Mod.)

**81-0419.** Lyon, J. L.; Gardner, J. W.; West, D. W. **Cancer In Utah: Risk by Religion and Place of Residence.** *Journal of the National Cancer Institute* 65(5): 1063-1071, November 1980.

Cancer incidence during 1967-75 was compared between Mormons and non-Mormons living in urban and rural areas of Utah. The most striking finding was the absence of an urban-rural difference in cancer incidence for Mormon men, especially noticeable at tobacco- and alcohol-associated sites where no significant difference at any cancer site was found. In contrast, non-Mormon men had a substantial (34 percent) gradient between urban and rural cancer incidence, much of it due to tobacco-related cancer sites, particularly lung cancer. At tobacco-related cancer sites, urban Mormon rates were about 55 percent lower than non-Mormon rates. The urban female population was at higher risk than was the rural regardless of religion. The increase was not as striking as that observed in non-Mormon men (8 vs. 34 percent); cancers of the respiratory and gastrointestinal tracts and female genitalia contributed to the elevated risk. It is concluded that personal habits such as smoking and drinking and reproductive factors were possible explanations for the previously observed urban-rural gradients in cancer risk. (Auth. Abs. Mod.)

**81-0420.** Martin, R. R.; McLemore, T. L.; Wray, N.; Cantrell, E. T.; Busbee, D. L. **Induction by Cigarette Smoking of Enzymes Which Process Carcinogenic Aromatic Hydrocarbons.** *Bulletin of the International Union Against Tuberculosis* 54(1): 77-79, March 1979.

Aryl hydrocarbon hydroxylase (AHH) induction in pulmonary alveolar macrophages, lymphocytes, and lung tissue from seven noncancer and seven lung cancer patients was studied. All patients were smokers. For individual noncancer patients, an excellent correlation was noted for AHH in all three tissues. For individual lung cancer patients, AHH values of the same three tissues exhibited poor correlation. In studies with lung cancer patients, use of any single cell type (e.g., lymphocytes) may not accurately assess the capacity of the individual for AHH induction. (Auth. Abs. Mod.)

**81-0421.** Melamed, M. R.; Zaman, M. B.; Flehinger, B. J.; Martini, N. **Radiologically Occult In Situ and Incipient Invasive Epidermoid Lung Cancer. Detection by Sputum Cytology in a Survey of Asymptomatic Cigarette Smokers.** *American Journal of Surgical Pathology* 1(1): 5-16, March 1977.

Approximately 8,000 cigarette-smoking men over the age of 45 have entered into a lung cancer detection program in New York City. Cytologic examinations of sputum were carried out on 4,000 subjects and lung cancer was found by this

technique in 9 men with normal chest X-rays. Seven had in situ or incipient invasive epidermoid carcinoma confined to the bronchus. These seven cases were studied by detailed histologic examinations of the bronchial tree in the resected specimens through sixth generation subsegmental bronchi. It was concluded that (1) invasive epidermoid carcinoma arises from carcinoma in situ of bronchial surface epithelium or an extension of that neoplastic epithelium in bronchial glands, (2) the site of origin is a segmental bronchus in most instances, and (3) each carcinoma should be considered as unifocal in origin even though there is a continuing risk of another primary lung cancer. It seems unlikely that squamous metaplasia or basal hyperplasia is an essential step in carcinogenesis; rather, it is believed that carcinoma may arise in bronchial epithelium without regard to the presence or absence of basal hyperplasia or squamous metaplasia, which should be considered nonspecific reactions to injury that may or may not accompany carcinogenesis. (Auth. Abs.)

**81-0422.** Morosco, G. J.; Goeringer, G. C. **Lifestyle Factors and Cancer of the Pancreas: A Hypothetical Mechanism.** *Medical Hypotheses* 6(9): 971-985, September 1980.

The interaction of a genetically determined protease inhibitor, the enzymes whose functions are modified by that inhibitor, and lifestyle factors, such as cigarette smoking, high lipid diet, and alcohol consumption, are considered key factors in a proposed protease-antiprotease imbalance mechanism for pancreatic oncogenesis. Epidemiologic and experimental laboratory evidence in support of the mechanisms is presented. In one study, it was found that smoke inhalation (12 cigarettes/day for 600 days) in beagles produced significant changes in the level of pancreatic protease when compared to controls. Within the smoke-exposed group, the high-nicotine (1.91 mg) cigarettes, as compared to low-nicotine (0.16) cigarettes, caused higher protease levels and lower serum-trypsin inhibitor values. Research initiatives to further test the hypothesis are discussed. (Auth. Abs. Mod.)

**81-0423.** National Cancer Institute. **Interim Report. International Epidemiologic Study of the Relationship Between Smoking and Lung Cancer: First Two Years of Survey in Western Europe.** U.S. Department of Health, Education, and Welfare, National Institutes of Health, National Cancer Institute, Smoking and Health Program, December 31, 1979, 159 pp.

This is the first report on epidemiologic studies of smoking and lung cancer incidence in Western Europe. Study centers are located in Vienna, Austria; Paris, France; Hamburg and Heidelberg, West Germany; Milan and Rome, Italy; and Glasgow, Scotland. Respondents are hospital and clinic patients from the study centers and, in most situations, other cities in the same country. Cases are lung cancer patients, with two controls matched to each case. This report covers approximately the first 2 years of data collection. There are insufficient data as yet to perform extensive analytical results

and derive epidemiologic findings. However, this first report summarizes some general descriptive characteristics of the respondents interviewed thus far, presents tabulations of their smoking practices (e.g., starting age, daily consumption, holders, filters, inhalation, puffing), and contains some preliminary analytical results of hypothesized associations between disease incidence, smoking habits, and related factors.

**81-0424.** National Cancer Institute. Report No. 5. Toward Less Hazardous Cigarettes. Summary: Four Skin Painting Bioassays Using Condensate From Experimental Cigarettes. U.S. Department of Health, Education, and Welfare, National Institutes of Health, National Cancer Institute, Smoking and Health Program, September 1980, 31 pp.

Major findings of separate reports published in 1974, 1975, 1977, and 1980 on each of four skin painting bioassays of experimental less hazardous cigarettes are summarized; and smoke constituent analyses are reported. The main objective of these four experiments was to determine the tumorigenic activity of condensate from each experimental cigarette using equal weights of dry smoke condensate applied daily for 18 months to mouse skin. A variety of factors were tested for tumorigenicity: laminae/stems, reconstituted sheet paper and slurry processes, fertilizer application, suckering, artificial tobacco substitutes, paper porosity, filters, additives (e.g., sugar, humectant, cocoa, magnesium nitrate), nicotine, and pesticide-treated plants. All data were compared to the standard experimental blend (SEB) cigarette. Findings included less tumorigenicity (as compared to SEB) of condensate from cigarettes with high-porosity paper, tobacco stems only, and reconstituted sheet. Expanded and freeze-dried SEB blend condensates were less tumorigenic than SEB condensate. Among the additives, magnesium nitrate reduced condensate tumorigenicity, whereas powdered cocoa appeared to have the opposite effect. The air dilution filter was found to be more effective than either the permanganate or the cellulose acetate filter in reducing the tumorigenicity of the condensate. No significant differences were observed between cigarettes made from pesticide-treated or pesticide-free tobacco.

**81-0425.** Rohan, T.; Christie, D. Australian Lung Cancer Mortality. *Medical Journal of Australia* 1(10): 489-490, May 17, 1980.

Standardized mortality ratios for lung cancer in Australia were calculated for the years from 1950 to 1977, using the death rates of the 1961 Australian census population as a standard. In the case of women, it was apparent that the lung cancer rate was accelerating. A definite slowing down for the rate in men was seen. A cohort analysis, where the death rates of successive generations were compared, showed each successive generation to be at a greater risk than its predecessor for all ages and in both sexes. Because of the long latency period in cancer development, cigarette smoking surveys

should be repeated for many years, in order to make meaningful correlations and prediction of trends.

**81-0426.** Sundell, L. Lung Cancer in Miners in Relation to Smoking Habits. *European Journal of Respiratory Diseases* 61(Supplement 107): 131-132, 1980.

This study of lung cancer cases among miners in a parish of central Sweden indicates that there is an excess morbidity from lung cancer in miners, that nonsmokers are overrepresented (47 percent) among lung cancer cases, and that the induction time for lung cancer is about 10 years shorter in smokers. (Auth. Abs.)

**81-0427.** Tawodzera, P.; Gelfand, M.; Loewenson, R. Carcinoma of the Oesophagus. *Central African Journal of Medicine* 26(4): 86-90, April 1980.

A total of 123 cases in Zimbabwe, diagnosed as cancer of the esophagus, were reviewed. Some epidemiological, clinical, and radiological aspects of the disease in 78 patients are presented. A total of 78 patients without malignancies served as controls. There was a significant ( $p < 0.01$ ) association between the consumption of both alcohol and tobacco and carcinoma of the esophagus (68 cancer patients vs. 13 controls were smokers and consumed alcohol). There was no correlation between smoking or alcohol consumption alone and esophageal carcinoma.

**81-0428.** Tola, S.; Tenho, M.; Korkala, M.-L.; Jarvinen, E. Cancer of the Urinary Bladder in Finland. Association With Occupation. *International Archives of Occupational and Environmental Health* 46(1): 43-51, April 1980.

The occupational histories of 180 cases of cancer of the urinary bladder were compared to those of an age- and sex-matched control group in a questionnaire study. The cases were drawn from the records of the Finnish Cancer Registry for the years 1975-1976 and represented the most industrialized areas of Finland. Controls were chosen from the noncancer patients in the same hospitals. Smoking was statistically significantly more common among the cases ( $p < 0.01$  for males and  $p < 0.001$  for females) than among the controls. There were more concrete- and cement-exposed workers among the cases than controls, but this difference was not statistically significant; neither was there any other statistically significant difference in occupational exposure between the cases and controls. The occupations without chemical exposure were evenly distributed between the cases and controls. This indicates that occupational exposure probably has not been a major factor in the etiology of bladder cancer in Finland. Nevertheless, the small size of the sample and the insensitivity of the postal questionnaire may explain the seemingly negative result of the study. The exposure to cement and concrete as a possible etiologic factor of bladder cancer may need further study.

81-0429. Vutuc, C.; Gredler, B. Soziale Schicht und Bronchuskarzinom. Quantitative und qualitative Aspekte des Zigarettenkonsums. [Social Class and Bronchial Cancer. Quantitative and Qualitative Aspects of Cigarette Consumption.] *Onkologie* 3(1): 22-25, 1980, German.

The smoking habits of 400 male lung cancer patients were surveyed and compared with those of 280 controls not treated for any tobacco-related disease. There were more persons from the lower classes in the control group than among the lung cancer patients. Significant differences between the two groups were found with respect to the percentage of cigarette smokers (95 vs. 71 percent in the control group), and the distribution of cigarette smokers by social class (94 vs. 72 percent in the lowest class). Among the lung cancer patients with identical tar exposure (smokers of cigarettes with more than 24 mg tar), the difference in the distribution of smokers between social classes was not significant. In contrast, the difference was significant between the social classes of the smoking controls with respect to tar exposure. Tar exposure of the smokers increases in lower social classes of the controls, while it is class-independent in tumor patients. Thus, lung cancer risk is greater in the lower social classes.

81-0430. Vutuc, C.; Holzer, R. Der Zeitablauf bis zur Diagnose bei weiblichen Lungenkrebs-Patienten. [From Anamnesis to Diagnosis in Women With Lung Cancer.] *Praxis und Klinik der Pneumologie* 34(10): 601-605, October 1980, German.

Women with bronchogenic carcinoma (n=41) were studied with respect to their smoking habits and past history up to the time of diagnosis. A total of 85 percent of them were cigarette smokers; 97 percent had smoked for >20 years and 68 percent had consumed >20 cigarettes/day. Out of 41 women, 38 (93 percent) saw the doctor on account of symptoms. Of these, 25 were immediately suspected as having lung cancer while 13 cases were either incorrectly diagnosed or not at all. In 3 patients (7 percent), suspected lung cancer was accidentally discovered. In 25 of 38 patients (66 percent), there was a delay of >1 week before the diagnosis was established, the patient being responsible for the delay in 12 cases, the doctor in 7, and both in 6 cases. Verification of the diagnosis took <1 month in 24 percent of the patients, >1 month in 5 percent, 2 months in 12 percent, and >3 months in 59 percent of the cases. (Auth. Abs. Mod.)

81-0431. Weiss, W. The Cigarette Factor in Lung Cancer Due to Chloromethyl Ethers. *Journal of Occupational Medicine* 22(8): 527-529, August 1980.

In a prospective study of 51 men who had moderate to heavy cumulative exposure to chloromethyl ethers, 11 developed lung cancer in a 10-year period. The risk was higher ( $p<0.001$ ) in men who were not smoking cigarettes at the start of observation than in those who were. This difference was even more impressive when examined in relation to the

risks of lung cancer by smoking habit in the general population. The data suggest that continued cigarette smoking entailed a factor which partially inhibited the carcinogenic effect of chloromethyl ethers. (Auth. Abs.)

81-0432. West, D. W. An Assessment of Cancer Risk Factors in Latter-Day Saints and Non-Latter-Day Saints in Utah. In: Cairns, J.; Lyon, J. L.; Skolnick, M. (Editors). *Cancer Incidence in Defined Populations*. Banbury Report No. 4, Cold Spring Harbor Laboratory, 1980, pp. 31-49.

Cancer risk factors were assessed in a case-control study of colon, cervical, and ovarian cancer in Mormons and non-Mormons in Utah. The study subjects were surveyed on demographic variables, on the use of tobacco, alcohol, coffee, tea, and on marital and sexual behavior. Surveys were conducted between 1976 and 1979. Smoking was more prevalent among non-Mormons than Mormons. Among Mormon men and women, 10 and 7 percent were smokers, respectively, while among non-Mormons, the corresponding percentages were 35 and 41. The mean years smoked and mean daily cigarette consumption were also less in Mormons than in non-Mormons. It is stated that the smoking data needs further refinement in order to determine the role of smoking in cancer incidence in Mormons.

81-0433. Winkelstein, W., Jr.; Levin, L. I.; Stellman, S. D.; Austin, H.; Wynder, E. L. Confounded Confounding. (Letters). *American Journal of Epidemiology* 113(1): 99-103, January 1981.

A recently reported hospital-based case-control study suggesting that the observed association between smoking and cervical cancer is more the result of confounding than of consistency with the causal hypothesis (*American Journal of Epidemiology* 111(4): 383-388, April 1980; *American Journal of Epidemiology* 106(4): 257-259, October 1977) is disputed by the authors of the causal hypothesis. Justification for the selection of the case and control populations is discussed in terms of whether (1) the populations are representative or with biases, (2) there is a satisfactory explanation for certain case and control exclusions (e.g., never-marrieds, ex-smokers, irregular smokers, smokers for <10 years), and (3) sexual activity acts as a confounder. The authors of the case-control study provide previously published data on their study population to support their view on confounding and conclude with a statement that smoking has been identified as a risk factor in some studies of the etiology of cervical cancer, but that confounding by sexual activity has been cited by many investigators as a possible explanation of positive associations. See also 80-1407 and 78-0645.

81-0434. Wynder, E. L.; Hecht, S. (Editors). *Lung Cancer*. International Union Against Cancer, UICC Technical Report Series, Volume 25, Geneva, 1976, 173 pp.

This monograph summarizes the main causes of lung cancer and describes the histopathology of malignant and precancerous lung lesions. The opportunities and limitations of animal experimentation in the field of lung carcinogenesis are also reviewed. Mechanisms by which the organism may counteract the carcinogen or protect itself against the development of cancer cells are discussed. The chapters in the monograph include one on epidemiology, a part of which deals with the epidemiology of cigarette smoking, as well as chapters on the less harmful cigarette and on preventive measures. The epidemiological evidence has clearly established cigarette smoking as a causative factor in the etiology of lung cancer and has also demonstrated a reduction in risk of lung cancer when cigarettes with reduced tar yield have been smoked for  $\geq 10$  years. The less harmful cigarette is defined in terms of biological activity and chemistry with a view toward present progress as well as future developments.

See also, 81-0385, 81-0437, 81-0469

**81-0435.** Wynder, E. L.; Stellman, S. D. **Impact of Long-Term Filter Cigarette Usage on Lung and Larynx Cancer Risk: A Case-Control Study.** *Journal of the National Cancer Institute* 62(3): 471-477, March 1979.

A case-control study was conducted among 1,034 white male and female hospital patients with histologically proved lung cancer (Kreyberg type I) or larynx cancer. After adjustment for duration of the smoking habit, inhalation, and butt length, relative risks of developing lung or larynx cancer were consistently lower among long-term smokers of filter cigarettes than among smokers of nonfilter cigarettes, irrespective of quantity smoked. Relative risks in all groups declined with increased years of smoking cessation. The observed risk reduction among current smokers of filter cigarettes was consistent with that expected, considering that these persons had smoked the older high-tar nonfilter cigarettes for a large proportion of their lives. (Auth. Abs.)

## NON—NEOPLASTIC RESPIRATORY DISEASES

**81-0436.** Adlkofer, F.; Scherer, G.; Weimann, H.; Huber, G. L.; Freedman, A. P.; Aviado, D. M.; Shor, R. E.; Williams, D. C.; Kauffmann, F.; White, J. R.; Froeb, H. F. **Small-Airways Dysfunction in Passive Smokers. (Letters).** *New England Journal of Medicine* 303(7): 392-394, August 14, 1980.

Previously reported evidence (*New England Journal of Medicine* 302(13): 720-723, March 27, 1980) of small airways disease in passive smokers is discussed. Differences in mid-expiratory and end-expiratory flow found in nonsmokers, passive smokers, and smokers in the original study are found statistically dubious by some authors and requiring verification by others. However, one letter states that these observations of small airways disease in passive smokers are important in light of occupational consequences. Another letter provides respiratory function data for persons aged 25-59 years from households in eight towns in France, and not only supports the original study data but provides additional evidence using forced expiratory volume in 1 sec data. The authors of the original study label statistical criticisms as spurious and cite references to support their findings and to refute their critics. See also 80-1190.

**81-0437.** Band, P.; Feldstein, M.; Saccomanno, G.; Watson, L.; King, G. **Potentiation of Cigarette Smoking and Radiation. Evidence From a Sputum Cytology Survey Among Uranium Miners and Controls.** *Cancer* 45(6): 1273-1277, March 15, 1980.

To assess the effect of cigarette smoking and of exposure to radon daughters, a prospective survey consisting of periodic sputum cytology evaluation was initiated among 249 underground uranium miners (210 of whom were smokers) and 123 male controls (100 of whom were smokers). Sputum cytology specimens showing moderate atypia, marked atypia, or cancer cells were classified as abnormal. As compared to control smokers, miners who smoke had a significantly higher incidence of abnormal cytology ( $p=0.025$ ). For miner smokers, the observed frequencies of abnormal cytology were linearly related to cumulative exposure to radon daughters and to the number of years of uranium mining. A statistical model relating the probability of abnormal cytology to the risk factors was investigated using a binary logistic regression. The estimated frequency of abnormal cytology was significantly dependent, for controls, on the duration of cigarette smoking, and for miners, on the duration of cigarette smoking and of uranium mining ( $p<0.05$  for both groups). (Auth. Abs.)

**81-0438.** Boucher, R. C.; Johnson, J.; Inoue, S.; Hulbert, W.; Hogg, J. C. **The Effect of Cigarette Smoke on the Permeability of Guinea Pig Airways.** *Laboratory Investigation* 43(1): 94-100, July 1980.

The epithelium lining the conducting airways restricts the movement of inhaled foreign materials into the interstitial and circulatory space. The effects of graded doses of inhaled whole cigarette smoke on this function were studied by measuring the rate of movement of horseradish peroxidase



(HRP) from the airways lumen across the tracheal epithelium into blood, by assessing the penetration of HRP into tracheal epithelium using transmission electron microscopy, and by examining the morphology of tracheal epithelial tight junctions using the freeze-fracture technique. These studies showed that 5, 20, and 100 puffs of whole smoke increased penetration of HRP from the tracheal lumen into blood in a dose-dependent fashion. Transmission electron microscopy showed that HRP penetrated the tracheal epithelium only in the 100-puff exposure group while the freeze-fracture studies showed progressive disruption of epithelial tight junction beginning with a 100-puff exposure and becoming more extensive after the 200-puff exposure. Inhaled cigarette smoke damages the mucosal barrier and causes increased permeability to HRP by disrupting the intercellular tight junctions. The appearance of HRP in blood is more sensitive than electron microscopy in assessing this damage.

**81-0439.** Buist, A. S. The Single-Breath Nitrogen Test in the Identification of the High-Risk Individual: Epidemiologic Evidence in Smokers. In: Dosman, J. A.; Cotton, D. J. (Editors). *Occupational Pulmonary Disease. Focus on Grain Dust and Health*. New York, Academic Press, 1980, pp. 111-119.

The smoker who is at high risk of developing irreversible airflow obstruction can possibly be identified at a time when structural changes in the lung are largely reversible. This chapter reviews evidence that may determine the validity of the hypothesis that there is a definite relationship between peripheral airway obstruction and subsequent development of irreversible airflow obstruction. Information available from cross-sectional and longitudinal studies that used the single-breath nitrogen test (SBNT) was compared with studies using spirometric tests in an attempt to define present understanding of the value of early diagnosis of chronic airflow obstruction and, more specifically, about the value of SBNT in early diagnosis. It is stated that virtually no relationship between peripheral airway obstruction in early adult life and subsequent development of irreversible airflow obstruction has been observed, and that a final judgment on the value of SBNT in early diagnosis cannot be made until further longitudinal information is available. (Auth. Abs. Mod.)

**81-0440.** Burrows, B.; Hasan, F. M.; Barbee, R. A.; Halonen, M.; Lebowitz, M. D. Epidemiologic Observations on Eosinophilia and Its Relation to Respiratory Disorders. *American Review of Respiratory Disease* 122(5): 709-719, November 1980.

The percentage of eosinophils (percent EOS), determined from a differential blood smear, was measured in 2,311 subjects enrolled in a general population study in Tucson, Arizona. Subjects were divided into two age subgroups, 6-54 years and  $\geq 55$  years. The percentage prevalences of ever-smokers, ex-smokers, and respiratory symptoms were listed. In men, but not in women, there was a significant tendency

for the percent EOS to decrease with age ( $p < 0.01$ ). Blood eosinophils were significantly related to allergy skin test reactivity, circulating IgE concentrations, several respiratory symptoms and disease diagnoses, as well as to reduced ventilatory function. Among subjects younger than 55 years of age, however, ventilatory function was significantly low, and symptom rates increased only when there was allergy skin test reactivity in addition to eosinophilia. Neither allergy skin test reactivity nor eosinophilia alone was related to ventilatory function in this age group. Among older subjects, blood eosinophilia was associated with definite impairment of ventilatory function regardless of skin test reactivity, and independent of smoking habits. In order to insure that the results were not being affected by the differing cigarette smoking habits of the various groups, the subject's pack-years of cigarette consumption were used to adjust individual data to nonsmoking values. After this adjustment, a significant relation of ventilatory impairment to eosinophilia in the older age group remained. Ventilatory function data in relation to eosinophilia in subjects with smoking histories that differ were presented. The difference between eosinophilic and noneosinophilic subjects was not significant among smokers, but was significant among never-smokers (for never-smokers  $> 54$  years of age percent predicted  $V_{max50}$  percent,  $p < 0.001$ , percent predicted forced expiratory volume in 1 sec,  $p < 0.01$ ). In the total population, smoking was found to be a more important determinant of ventilatory impairment than percent EOS. The presence of eosinophilia identified a predominantly female group of elderly nonsmokers with markedly impaired ventilatory function. These subjects appeared to fall into the clinical category of "asthmatic bronchitis." (Auth. Abs. Mod.)

**81-0441.** Chan, T. L.; Lippmann, M. Experimental Measurements and Empirical Modelling of the Regional Deposition of Inhaled Particles in Humans. *American Industrial Hygiene Association Journal* 41(6): 399-409, June 1980.

Regional deposition of inhaled particles was studied experimentally in a hollow cast of the human larynx-tracheobronchial tree extending through the first 6 branching levels, and in 26 nonsmoker human volunteers in vivo. Results of the hollow cast study indicated a linear dependence of particle deposition efficiency on the Stokes number for aerosols with aerodynamic diameters  $> 2 \mu\text{m}$ . Alveolar and total respiratory tract in vivo deposition in healthy nonsmokers was minimal for particles of approximately  $0.4 \mu\text{m}$ , and alveolar deposition for mouthpiece inhalations peaked for particles of approximately  $3 \mu\text{m}$ . A new anatomic parameter, the bronchial deposition size (BDS), is introduced to permit the classification of various individuals and populations according to their tracheobronchial deposition efficiencies. The average BDS's were 1.20 cm for 26 healthy nonsmokers, 1.02 cm for 46 cigarette smokers, 0.90 cm for 19 clinical patients being treated for obstructive lung disease, and 0.60 cm for 6 severely disabled patients. (Auth. Abs.)

**81-0442.** Chan-Yeung, M.; Wong, R.; MacLean, L.; Tan, F.; Dorken, E.; Schulzer, M.; Dennis, R.; Grzybowski, S. **Respiratory Survey of Workers in a Pulp and Paper Mill in Powell River, British Columbia.** *American Review of Respiratory Disease* 122(2): 249-257, August 1980.

A respiratory survey was carried out in 1,932 workers in the pulp and paper mill in Powell River, British Columbia. The survey included a medical-occupational questionnaire, spirometry, chest radiographs, and environmental monitoring. The results obtained in 1,826 white male workers (of whom 21.8 percent were nonsmokers, 35.7 percent ex-smokers, and 42.5 percent current smokers) were analyzed. The workers were divided into six groups according to the type of exposure at work: subjects in group 1 were mainly exposed to gases, vapors, and chemicals in the kraft mill; group 2, to wood dust; group 3, to paper dust; group 4, to carbon monoxide (CO); group 5, to all kinds of air contaminants; group 6 (control subjects), to much lower levels of various air contaminants at work. Respiratory symptoms were found to be more prevalent in smokers than in nonsmokers ( $p < 0.01$ ). Cigarette smoking also had a significant deleterious effect on pulmonary function (e.g., on forced expiratory volume in 1 sec ( $p < 0.0001$ ), on forced vital capacity ( $p < 0.001$ ), and on forced expiratory flow at 25-75 percent vital capacity ( $p < 0.0001$ )). Alcohol consumption also affected pulmonary function. Among nonsmokers, those who admitted to having >three drinks/day had significantly lower pulmonary function than those who had no drinks or <three drinks/day during the previous week. Among current smokers and ex-smokers, the effect of alcohol consumption on pulmonary function was not significant. The concentrations of sulfur dioxide, hydrogen sulfide, and chlorine encountered in Powell River were low, well below the currently accepted threshold limit values, and this may account for the negative findings in this study. Similar studies should be carried out in other pulp and paper mills in British Columbia to establish whether the currently accepted threshold limit values for these gases are adequate. (Auth. Abs. Mod.)

**81-0443.** Cohen, B. S.; Harley, N. H.; Rogers, A. W. **An Autoradiographic Search for Radioactive Particles in the Lungs of Cigarette Smokers. (Letters).** *Archives of Environmental Health* 35(5): 313-314, September-October 1980.

The sensitivity of two different techniques of detecting radioactive activity in lungs of smokers as compared to nonsmokers, and the statistical vs. health significance of the resulting data (*Archives of Environmental Health* 35(2): 117-122, March-April 1980) is discussed. See also 80-1379.

**81-0444.** Dosman, J. A.; Cotton, D. J.; Graham, B. L.; Hall, D. L.; Li, R.; Froh, F.; Barnett, G. D. **Sensitivity and Specificity of Early Diagnostic Tests of Lung Function in Smokers.** *Chest* 79(1): 6-11, January 1981.

The relative sensitivities and specificities of the "early" tests of lung dysfunction are examined. The findings from a study of virtually the entire population (418 nonsmokers, 456 smokers, and 275 ex-smokers, comprising 90.2 percent of the population) of a rural pollution-free community are described. Using abnormal spirometry as a marker of obstructive disease, an evaluation was made of the two tests obtained from the single-breath nitrogen curve, closing volume (CV/VC) and the slope of the alveolar plateau ( $\Delta N_2/I$ ), as well as combinations of the two tests. While CV/VC is highly specific (92.3 percent in male and 94.0 percent in female subjects), it lacks sensitivity (36.8 percent in male and 13.3 percent in female subjects) and is abnormal in only 10.0 and 6.5 percent of male and female smokers, respectively, a percentage not dissimilar from the percentage with abnormal spirometry. However  $\Delta N_2/I$ , abnormal in 24.1 percent of male smokers and 28.8 percent of female smokers, rates reasonably well with regard to both sensitivity (63.2 percent in male and 66.7 percent in female subjects) and specificity (79.3 percent in male and 74.0 percent in female subjects). The group of smokers with abnormal  $\Delta N_2/I$  did not include fair numbers with abnormal spirometry (20.7 percent in male and 16.1 percent in female subjects). A combination of the two tests (abnormal in either  $\Delta N_2/I$  and/or CV/VC) has good sensitivity (68.4 and 80.0 percent for male and female subjects, respectively) and specificity (74.3 and 69.0 percent for male and female subjects, respectively). (Auth. Abs. Mod.)

**81-0445.** Drath, D. B.; Davies, P.; Karnovsky, M. L.; Huber, G. L. **Tobacco Smoke and the Pulmonary Alveolar Macrophage.** *Advances in Experimental Medicine and Biology* 121(A): 555-568, 1979.

The effects of tobacco smoke on the structure, function, and metabolism of rat pulmonary alveolar macrophages (PAM) were investigated. After exposure to quantified dosages of tobacco smoke for periods of 30 to 180 consecutive days the macrophages were harvested by bronchopulmonary lavage. Structural changes of PAM after 30-90 days of smoke exposure included an increase in mean maximum diameters, increased presence of lipid inclusions, and a reduced nucleus/cytoplasmic ratio. The greatest degree of change was shown after 60 days' exposure, with a mean cell diameter of 14.4  $\mu\text{m}$ , compared with a control value of 11.2  $\mu\text{m}$ . After 30 and 90 days' smoke exposure the volume density of lipid inclusions was increased 10- and 20-fold, respectively. Functional changes were measured by changes in PAM phagocytic abilities. Testing with  $^{14}\text{C}$ -labeled *Staphylococcus aureus* and inert starch particles showed that 30-day exposure resulted in an enhancement of phagocytic ability while an inhibition of approximately 35 percent after 30 min was seen in PAM exposed for 180 days. Changes in oxygen and glucose metabolism were also determined by measuring oxygen consumption, superoxide release, hydrogen peroxide release, glucose oxidation, and hexose monophosphate shunt activity. Exposure for 30 days resulted in increased oxygen consumption (twofold) and hydrogen peroxide release; however, superoxide release was unaffected. Upon exposure for 180

days, all three oxygen metabolism parameters increased. It is noted that these effects on metabolism occurred only during phagocytosis, not when the cells were at rest. Glucose oxidation was unaffected by either the 30-day or 180-day smoke exposure. However, hexose monophosphate shunt activity was depressed both at rest and during phagocytosis after the 30-day exposure.

**81-0446.** Finch, G. L.; Fisher, G. L.; Hayes, T. L.; Golde, D. W. *Morphological Studies of Cultured Human Pulmonary Macrophages. Scanning Electron Microscopy* (3): 315-326, 1980.

A morphological classification scheme is developed for the quantitative in vitro examination, by scanning electron microscopy (SEM), of pulmonary alveolar macrophages (AM) from human cigarette smokers and nonsmokers. The AM were obtained by bronchopulmonary lavage, allowed to attach to glass coverslips in a serum-containing medium, cultured for 1, 2, or 25 hrs, and examined in the SEM. Fifty cells per sample were randomly selected for detailed morphological analysis using a predetermined sampling grid. Area, form, degree of cell spreading, and the relative abundances of surface features, including ruffles, filopodia, blebs, microvilli, multiple features, and no surface features were quantified. Smoker AM had a greater incidence of ruffles, filopodia, multiple features, and rounded cells; nonsmoker AM had greater incidences of featureless and spread cells. Microvilli and blebs were observed infrequently and displayed no trends with respect to differences between smokers and nonsmokers. The incidence of filopodia, multiple features, and intermediate shapes generally increased with increasing culture time; and a decreasing incidence with increasing time in culture was observed for featureless and spread cells. For the 1- and 2-hr culture periods, slightly greater sizes, size variances, form factors, and form factor variances were observed for smoker AM; however, after 25 hrs in culture, nonsmoker AM populations possessed these characteristics. Area frequency distributions appeared to be logarithmically normal in distribution. Statistical analyses indicated that for area and form, the greatest variance was due to variations among the individuals lavaged. (Auth. Abs.)

**81-0447.** Harel, S.; Janoff, A.; Yu, S. Y.; Hurewitz, A.; Bergofsky, E. H. *Desmosine Radioimmunoassay for Measuring Elastin Degradation In Vivo. American Review of Respiratory Disease* 122(5): 769-773, November 1980.

Desmosine is a cross-link amino acid unique to elastin. Previous work has shown that during turnover in the body, desmosine is not reused, and that desmosine is not absorbed from the intestine. Instead, all desmosine released in the course of elastin metabolism is excreted in the urine attached to low molecular weight peptides. Therefore, measurement of desmosine in acid-hydrolysates of urine might be used to monitor elastin breakdown in several pathologic states, including pulmonary emphysema. In the present report, a

sensitive, highly specific radioimmunoassay capable of detecting as little as 200 pg of desmosine in acid-hydrolysates of urine is described. The assay was specific for desmosine; cross-reactivity with merodesmosine, isodesmosine, lysine, and mixed amino acids was 0.25 percent, 0.1 percent, <0.0003 percent, and 0 percent, respectively. Normal, non-smoking subjects ( $n=23$ ) had a mean 24-hr desmosine excretion of  $47 \pm 15 \mu\text{g}$ . In a group of smokers ( $n=14$ ) with evidence of chronic obstructive lung disease and/or lung infection, the values for desmosine excretion ranged from 40 to  $400 \mu\text{g}/24$  hrs. Desmosine radioimmunoassay may find application in the study of diseases involving increased destruction of elastin in the body. (Auth. Abs. Mod.)

**81-0448.** Hesse, H.; Mizera, W.; Kasperek, R.; Nakhosteen, J. A.; Konietzko, N. *Die Ziliarfrequenz Lungengesunder—erste Ergebnisse einer neuen In-vitro-Methode. [In-Vitro Measurement of the Frequency of the Ciliary Beat.] Praxis und Klinik der Pneumologie* 34(9): 565-569, September 1980, German.

A clinical method is described which allows the in vitro measurement of the frequency of the ciliary beat. Brush biopsies, taken with a bronchoscope, are examined under a phase contrast microscope and the ciliary rhythm is measured directly by means of a photosensitive cell. In 20 healthy persons (12 men and 8 women, of whom 10 were smokers) the cilia of the trachea beat at an average frequency of  $12.5 \pm 2.8$  Hz, within a range of 4.9 to 17.4 Hz. In the more distal portions of the tracheobronchial tree the rhythm tends to increase. There was no difference between smokers and nonsmokers in the frequency of the ciliary beat ( $13.2 \pm 2.8$  Hz and  $12.8 \pm 2.3$  Hz, respectively). The method provides easily reproducible results and allows the separate study of one of the aspects of ciliary function. (Auth. Abs. Mod.)

**81-0449.** Hills, E. A.; Geary, M. *Membrane Diffusing Capacity and Pulmonary Capillary Volume in Rheumatoid Disease. Thorax* 35(11): 851-855, November 1980.

In some patients with rheumatoid disease gas transfer across the lungs is abnormal. The membrane component of gas transfer ( $D_m$ ) and pulmonary capillary volume ( $V_c$ ) was measured in 48 patients with rheumatoid arthritis and in 48 normal volunteers matched for age, sex, and smoking habits. Volunteers had normal chest radiographs and normal forced expiratory volume in 1 sec and vital capacity. There were no significant differences between the rheumatoid and control groups for  $D_m$ . Mean  $V_c$  in rheumatoid male smokers (64.0 ml, S.D. 16.5) was significantly lower than in control male smokers (76.3 ml, S.D. 18.0  $p < 0.05$ ). In rheumatoid female smokers mean  $V_c$  (43.4 ml, S.D. 13.3) was significantly lower than in rheumatoid female nonsmokers (58.4 ml, S.D. 15.4  $p < 0.01$ ). There was no significant difference between rheumatoid and control female nonsmokers (mean  $V_c$  58.4 ml and 60.7 ml, respectively). Significant differences in  $V_c$  in terms of percent predicted normal were found between patients receiv-

ing corticosteroids and those not receiving corticosteroids or penicillamine ( $p < 0.02$ ) and between patients with nodules and those without ( $p < 0.05$ ). Patients with persistently low transfer factor for 5 years had a significantly lower Vc ( $p < 0.02$ ). There was no consistent correlation between Dm and Vc and dynamic compliance or static recoil pressure. It appears that the abnormality of transfer factor in rheumatoid disease previously demonstrated is caused by reduction of Vc. It seems that involvement of pulmonary blood vessels occurs in patients with nodules and is suppressed by treatment with corticosteroids. (Auth. Abs.)

**81-0450.** Isawa, T.; Hirano, T.; Teshima, T.; Konno, K. Effect of Non-Filtered and Filtered Cigarette Smoke on Mucociliary Clearance Mechanism. *Tohoku Journal of Experimental Medicine* 130(2): 189-197, February 1980.

Acute effect of a short-term exposure to cigarette smoke on mucociliary clearance mechanism was studied in 69 anesthetized dogs. A tracer material, a macroaggregated albumin solution containing technetium ( $^{99m}\text{Tc}$ ), was placed in the right main bronchus near the carina 2 min after completion of exposure and its migration distance on the tracheal mucosa with time was assessed by a scintillation camera. The mean migrating velocity (MMV) was calculated. The average MMV values were  $12.0 \pm 1.0$  (mean  $\pm$  S.E.) mm/min in the control dogs, while the values were  $11.6 \pm 1.5$ ,  $8.3 \pm 2.2$ ,  $3.3 \pm 0.8$ , and  $4.2 \pm 2.3$  mm/min in the dogs which smoked one, three, five, and eight cigarettes, indicating that there was an inverse correlation between the number of cigarettes smoked and the MMV values. When cigarette smoke was filtered through a glass fiber filter, the average MMV values were  $7.0 \pm 0.5$  and  $1.3 \pm 0.9$  mm/min in the dogs which smoked five and eight cigarettes respectively, suggesting that once the number of cigarettes amounted to eight, even cigarette smoke filtered through a glass fiber filter was as detrimental to the mucociliary clearance mechanism as the nonfiltered cigarette smoke. (Auth. Abs. Mod.)

**81-0451.** Jancik, E. H.; Hansma, T. W.; Janssen, W.; Schouten, J. P.; Tiesinga-van der Veen, T.; Jansen-Santema, T. Die "Maximal mid Expiratory flow rate," der Ein-Sekunden-Wert der Vitalkapazität und Lungen-Ventilationen "normal" werte bei Rauchern, früheren Rauchern und Nichtraucher. [Maximum Mid Expiratory Flow Rate, Forced Expiratory Volume in One Second and "Normal" Values for Ventilatory Function in Smokers, Ex-Smokers and Non-Smokers.] *Praxis und Klinik der Pneumologie* 34(11): 657-680, November 1980, German.

A study was made to ascertain whether measurements of maximum mid-expiratory flow rate (MMEF) were more reliable than forced expiratory volume in 1 sec ( $\text{FEV}_1$ ) or  $\text{FEV}_1$  percent vital capacity (VC) for the early detection and diagnosis of obstructive ventilatory disturbances. The subjects were males aged 19-59 years. The calculations were based on spiropgraphic recordings made by means of a vitalograph.

With advancing age the values for all tests declined;  $\text{FEV}_1$  percent VC fell to 92 percent,  $\text{FEV}_1$  to 73 percent, and MMEF to as low as 62 percent (from 486 to 299), while  $T_{0.75}$  was prolonged by 35 percent. The case material was divided into three groups: nonsmokers, ex-smokers, and smokers. The average age of the three groups was 42, 46.5, and 45.4 years respectively. All tests showed a definite impairment of lung function in ex-smokers and smokers as compared with nonsmokers. The findings in ex-smokers and smokers did not differ greatly except in respect of the MMEF values. The most marked difference between nonsmokers and smokers was in respect of MMEF which declined to 76 percent in the latter group whereas  $\text{FEV}_1$  fell only to 91 percent and  $\text{FEV}_1$  percent VC to 94 percent. The findings were compared with the normal values. In all three groups the latter were always lower than the values actually measured, with the exception of MMEF; in nonsmokers the average values were higher (454) than the calculated normal values (434) while in ex-smokers and smokers they were definitely lower (374 and 347, respectively) than the standard values (410, 416 respectively). Against a positive difference of plus 20 in nonsmokers there were negative differences of minus 36 and minus 69 respectively in ex-smokers and smokers. An analysis of ventilatory function in relation to the quantity of tobacco consumed (tobacco years) also established a connection between the number of tobacco years and the degree of ventilatory impairment: forced vital capacity was reduced by 6 percent,  $\text{FEV}_1$  by 11 percent,  $\text{FEV}_1$  percent VC by 6 percent, and MMEF by as much as 34 percent. Here, too, the normal values for FVC,  $\text{FEV}_1$  and  $\text{FEV}_1$  percent VC were always lower than the measured average values; but over against the positive difference of MMEF in nonsmokers (plus 20) there was a negative difference in MMEF which ranged from minus 32 to minus 117 for those with a history of 200 tobacco years and of  $\geq 800$  tobacco years respectively. Similarly,  $T_{0.75}$  rose from 0.82 sec to 1.23 sec respectively. Although the results could not provide definite evidence that changes in MMEF were of greater differential diagnostic or prognostic significance than were changes in  $\text{FEV}_1$  values, the different pattern in the changes of MMEF and  $\text{FEV}_1$  lend support to the hypothesis. (Auth. Abs. Mod.)

**81-0452.** Klass, D. J. Cigarette Smoke Exposure In Vivo Increases Cyclic GMP in Rat Lung. *Archives of Environmental Health* 35(6): 347-350, November-December 1980.

The enzyme guanylate cyclase is stimulated to produce cyclic guanosine 3',5'-monophosphate (GMP) when lung tissue is exposed to cigarette smoke in vitro. These experiments tested whether in vivo cigarette smoke exposure in rats produces a similar response. Adult rats were anesthetized with pentobarbital and ventilation with mixtures of air and cigarette smoke at 10 cm  $\text{H}_2\text{O}$  inspiratory pressure was achieved after a tracheotomy was performed. Lung tissue samples were taken at intervals during the 20-min exposure period and analyzed for levels of cyclic adenosine 3',5'-monophosphate (AMP) and cyclic GMP. Blood carboxyhemoglobin (COHb) levels at 5 min and 15 min of exposure

showed high, but sublethal levels of COHb. Lung tissue cAMP was unchanged with this exposure, but cGMP levels rose dramatically. Rat lungs showed no changes related to ventilation under similar conditions in the absence of smoke. This observed response of cGMP to cigarette smoke may represent an important pulmonary defense mechanism. (Auth. Abs.)

**81-0453.** Kozak, J.; Weissova, J.; Slejtova, V. Zmena Kurackeho Navyku u Nemocnych s Chronickou Bronchitidou. [Changed Smoking Habits in Patients Suffering From Chronic Bronchitis.] *Studia Pneumologica et Phthiseologica Cechoslovaca* 39(6): 369-372, 1979, Czechoslovakian.

This is a report on the changed smoking habit of patients under clinical care who are suffering from chronic bronchitis. A followup extending 4 years was undertaken. Smokers had the connection between disease symptoms and their smoking explained and were persuaded of the need to stop cigarette smoking. After the lapse of 4 years one-fifth of the smokers had stopped smoking and three-fourths had stopped for a mean period of 2.4 years at the time of evaluation. Participation of the physician in patient motivation for giving up smoking was stressed. (Auth. Abs.)

**81-0454.** Lam, R. Transient Epithelial Loss in Rat Larynx After Acute Exposure to Tobacco Smoke. *Toxicology Letters* 6(4/5): 327-335, 1980.

After a single 1-hr exposure to cigarette smoke by inhalation, the degree of damage to the epithelial layer lining the ventral wall of the rat larynx has been assessed using a semi-quantitative scoring system. The damage was characterized mainly by partial or complete loss of epithelium. The time at which a maximal response was observed depended upon the smoke concentration. Regeneration was rapid and was followed by development of hyperplasia; the regenerative phase was progressively more delayed with higher concentrations of smoke. Smoke concentrations have been compared during the regenerative phase and an approximately linear dose-response relationship has been found. The causative agents were in the smoke particulate phase. The severity of the damage response may parallel the extent of subsequent hyperplasia and metaplasia. Laryngeal damage may thus provide a short-term bioassay for the inhalation toxicity of cigarette smoke. (Auth. Abs.)

**81-0455.** Marcq, M.; Minette, A. Nongravitational Terminal Nitrogen Rise in Smokers. *Bulletin European de Physiopathologie Respiratoire* 16(5): 607-621, 1980.

In normal subjects, the terminal gas rise (phase IV) of both resident nitrogen ( $N_2$ ) and bolus single-breath washout curves is gravity-related. Moreover the slope of the  $N_2$  washout curve is mainly related to nongravitational inequalities while the bolus washout curve reflects mainly interregional inhomogeneities of ventilation. The possibility that in subjects with increased steepness of the  $N_2$  washout curve the terminal  $N_2$  rise might predominantly reflect inequalities within lung regions while the bolus phase IV could still be gravity-related was tested. To this end, the effect of reversal of the gravity field on the  $N_2$  and helium (He) (bolus) phases IV in eight smokers with increased slope of phase III for  $N_2$  ( $3.2 \pm 0.4$  percent  $N_2/l$  mean  $\pm$  SE) was studied. In nine control subjects with normal lung function and normal slope of phase III ( $0.95 \pm 0.09$  percent  $N_2/l$ ), as expected, both  $N_2$  and bolus phases IV sloped downwards after head-down inhalation and expiration upright, but in five of the eight subjects with steep  $N_2$  curve, the terminal  $N_2$  phase remained ascending. The He phase IV was on the contrary downward in three of these five subjects in most tracings. However, after inhalation of an aerosol of atropine, the gravity-dependence of the  $N_2$  phase IV tended to be restored in these five smokers and their slope of  $N_2$  phase III was markedly reduced, although not to normal values. Thus, the study confirms that the  $N_2$  phase IV is less related to the vertical distribution of airway closure than the bolus phase IV. Moreover, the data indicate that the terminal  $N_2$  rise of smokers with increased slope of phase III for  $N_2$  may be essentially determined by nongravity-related inhomogeneities and emptying sequences while, in some of them, apex-to-base ventilation unevenness may still be detected by the bolus technique. The post-atropine findings suggest that abnormalities of phase III and phase IV of smokers may represent rapidly reversible airway narrowing, probably by smooth muscle contraction (and mucus obstruction), in addition to airway cellular inflammation and fibrosis, or emphysema, as previously proposed. (Auth. Abs.)

**81-0456.** Miller, M.; Olakowski, T. Ocena Sytuacji Epidemiologicznej w Zakresie Ostrych Chorob Układu Oddechowego na Materiale Losowo Dobranych Dorosłych Mieszkańców Plocka. [Estimation of Epidemiologic Situation in Sphere of Acute Diseases of Respiratory Tract on the Basis of Data Taken From Adult Inhabitants of Plock Chosen by the Lot.] *Pneumologia Polska* 48(6): 367-373, 1980, Polish.

In the group of 2,167 randomly chosen Plock inhabitants 30-70 years old, estimations were performed to reveal the frequency of incidence of chronic respiratory tract disease symptoms. A questionnaire was one of the methods used in this examination. The frequency of acute respiratory tract disease incidence was estimated in relation to sex, age, incidence or nonincidence of chronic bronchitis, and kind of work environment of the examined people. Significance of the observed difference was estimated uniformly on the significance level  $\alpha = 0.05$ . It was confirmed that respiratory tract disease incidence was reported more often by women than by men. Women smoking cigarettes reported such illnesses significantly more often than nonsmoking women. Such a difference in men was not confirmed. Falling ill with acute respiratory tract diseases was confirmed more often in people with chronic bronchitis than in people without such disease. Acute diseases of respiratory tract were more often reported by people working in harmful conditions in comparison with

the people who never worked in such conditions. (Auth. Abs. Mod.)

**81-0457.** Pre, J.; Bladier, D.; Battesti, J.-P. Cytological and Immunochemical Reactions of Human Alveoli to Tobacco Aggression: Importance and Characteristics. *IRCS Medical Science, Biochemistry* 8(9): 637-638, 1980.

A total of 11 healthy volunteers, 25-30 years old, were used to study the cytological and immunological results of tobacco aggression in alveoli. Bronchopulmonary lavages of six nonsmokers and five smokers (about  $15.4 \pm 5$  pack-years) were examined for cell populations (macrophages, lymphocytes, leukocytes) and immunoglobulins. The mean cell yield/mm<sup>3</sup> per lavage from smokers (1,743) was significantly ( $p < 0.001$ ) higher than that for nonsmokers (1,743 vs. 95.3, respectively). The ratio of IgG to total proteins was found to be significantly higher in smokers than in nonsmokers (0.184 vs. 0.056,  $p < 0.001$ ), as was the ratio of IgG to albumin (0.353 vs. 0.163,  $p < 0.05$ ). It was concluded that tobacco aggression leads to an important macrophagic response and to IgG secretion of alveoli. It is stated that this alveoli reaction should be considered when interpreting biological patterns of lavages from smoker patients with diffuse interstitial lung diseases.

**81-0458.** Rambaldi, M.; Rotiroli, D.; Cerciello, G. C.; Bizzarro, D.; D'Avanzo, A.; Polverino, M. Capacita di Diffusione, Capacita di Membrana e Volume Capillare Polmonare in Soggetti Normali, Fumatori e Non Fumatori. [Diffusion Capacity, Membrane Capacity and Pulmonary Capillary Volume in Normal Subjects, Smokers and Non-Smokers.] *Bollettino Della Societa Italiana di Cardiologia* 24(1): 43-53, 1979, Italian.

With the aim of evaluating the influence of age and body position on diffusion capacity for carbon monoxide (DLCO), membrane capacity for carbon monoxide (DMCO), and pulmonary capillary volume (Vc), 38 healthy subjects (20 nonsmokers and 18 smokers), divided into subgroups aged  $>45$  years and  $<45$  years, were studied. The DLCO, in the supine position, decreases with age; this decrease depends on an increased diffusion resistance at the level of the membrane components because in this position the capillary volume does not decrease but tends in fact to increase. Adoption of the supine position brings about (1) a significant improvement of the DLCO only in the young nonsmokers, (2) a significant decrease in the diffusion component at the membrane level in people aged  $>45$ , and (3) a definite increase of the Vc in all subjects examined. The results obtained are discussed in terms of interaction between equilibrium expiratory level, and closing volume and capacity. The latter, when it falls within the current volume, causes a decrease in lung ventilation and in the alveolar ventilation-perfusion ratio in the dependent areas, with a consequent decrease in the gaseous exchanges. (Auth. Abs.)

**81-0459.** Schaefer, O.; Eaton, R.D.P.; Timmermans, F.J.W.; Hildes, J. A. Respiratory Function Impairment and Cardiopulmonary Consequences in Long-Time Residents of the Canadian Arctic. *Canadian Medical Association Journal* 123(10): 997-1004, November 22, 1980.

Spirometry, roentgenography, and electrocardiography were performed during community health surveys in 1976-78 in 176 Inuit and other long-time residents of the northeastern (Arctic Bay) and western (Inuvik) Canadian Arctic, and the results were related to age, ethnic origin, occupation, history of climatic exposure, smoking, and hospitalization for tuberculosis. In Arctic Bay the young men showed excellent respiratory function, normal-sized pulmonary arteries, and normal electrocardiograms (ECG), but abnormalities of all three types were increasingly frequent and severe after age 25. The forced mid-expiratory flow (FMF) fell to less than 50 percent of the norm by age 40, and dilatation of the pulmonary artery, hypertrophy of the right ventricle, right bundle branch block, and a pseudoinfarction pattern on the ECG were frequently associated. In contrast, the men in Inuvik, an urbanized center, maintained above normal respiratory function until age 40, and the FMF and pulmonary artery diameter remained normal in the older men except for Inuit and white trappers over 60 years old. The FMF of all whites, Arctic Bay Inuit aged 25-39, and Inuvik aged 25-59 appeared to be negatively affected by smoking. However, it was found that Inuit aged 40-80 who were light smokers or nonsmokers had the lowest ventilatory function. These data suggest that inhalation of extremely cold air at maximum ventilation may be a prime factor in the chronic obstructive lung disease of Inuit hunters, whereas smoking has only a minor role and hospitalization for tuberculosis appears to protect from rather than contribute to this disorder. (Auth. Abs. Mod.)

**81-0460.** Segarra, F.; Baselga Monte, M.; Lopez Ibanez, P.; Perez Nicolas, J. Asbestosis in a Barcelona Fibrocement Factory. *Environmental Research* 23(2): 292-300, December 1980.

An epidemiological study of the incidence and clinical aspects of asbestosis was carried out in a fibrocement factory located near Barcelona. This is the first study of this nature in Spain. Out of 840 workers 729 were examined using the following procedures: medical questionnaire, biotype (weight and height), physical examination, chest radiography, pulmonary function tests (static lung volumes, forced expiratory volume (FEV), forced expiratory volume in 1 sec (FEV<sub>1</sub>), flow-volume curves, airway resistance, diffusion capacity for carbon monoxide), and laboratory procedures (serum proteins, asbestos bodies in sputa). Asbestosis was found in 214 workers. At the initial stages of the disease, pleural involvement appears in the radiological diagnosis earlier and more frequently than parenchymal, 26 and 13 percent, respectively. There is a well-defined linear relationship between asbestosis incidence and years of exposure: from 0 in the group with  $<5$  years of exposure, near 9 percent in the group with 5-9 years,

and up to 69 percent for those with  $\geq 30$  years of exposure. Pulmonary crepitations are the most significant physical finding, observed in one-third of the subjects. The clinical symptoms and the pulmonary function tests suggest beyond doubt a bronchial involvement in asbestosis. Findings among these workers were compared in relation to smoking history. Of the 729 workers 456 were smokers, 147 were nonsmokers, and 126 were ex-smokers. The incidence of clinical symptoms (e.g., cough, expectoration, dyspnea) was much higher among the smokers than the nonsmokers, 77.4 percent compared to 53 percent. For smokers with asbestosis there was a significantly higher incidence of symptoms than for smokers without asbestosis, while among the nonsmokers differences were small or nonexistent. Smokers were also found to have more frequently abnormal pulmonary function tests than nonsmokers, 50.8 percent as compared to 43.2 percent. (Auth. Abs. Mod.)

**81-0461.** Shelley, E.; Dean, G.; Daly, L.; Hickey, N. **Factors Related to Respiratory Symptoms in Irish Men.** *Irish Medical Journal* 73(6): 240-247, June 1980.

This study in Irish men was undertaken to identify factors related to respiratory symptoms and to investigate the relationship between the presence of respiratory symptoms and performance in a respiratory function test. It was found that risk factors for respiratory symptoms were a current smoking habit and membership within skilled (III), semiskilled (IV), and unskilled (V) social classes. Within professional (I) and intermediate (II) social classes smoking was less related to the presence of symptoms than in social classes III, IV, and V. Mean peak flow rates were significantly lower in those who reported respiratory symptoms ( $p=0.001$ ) and in those who were current smokers ( $p<0.02$ ). Mean peak flow rates showed significant differences between the social classes ( $p<0.0005$ ) and peak flow rates declined with increasing age ( $p<0.0005$ ). It is suggested that a screening program for the presence of respiratory symptoms and respiratory dysfunction could be initiated together with an intervention program to promote smoking cessation. (Auth. Abs. Mod.)

**81-0462.** Shephard, R. J.; Cox, M. **Physical Fitness, Respiratory Symptoms and Lung Function.** *Respiration* 39(4): 193-205, 1980.

Lung volumes (forced vital capacity, forced expiratory volume in 1 sec, and peak flow) were measured in 403 men and 561 women volunteers for fitness testing, using the SRL automated spirometer system. Average scores for this population were 5-10 percent higher than predicted from age, height, and sex using either the formula inherent in the SRL computer or standards proposed for the Toronto population; existing standards may thus underestimate respiratory potential. Lung function data showed a dose-dependent decrease within the category of cigarette smokers, but there was no significant difference between average results for smokers and nonsmokers. Multivariate analysis showed significant contri-

butions of lean mass and obesity to the overall description of lung volumes; however, effects were not large enough to justify incorporation of such variables into routine prediction equations. Positive responses to the respiratory section of the Cornell Medical Index were in several instances associated with below expected lung volumes. The most consistent response was to the question "do you suffer from asthma?" Although the average effect was significant, the magnitude of response (10-20 percent) would have been overlooked in individual testing. This suggests that there may be more scope for pulmonary screening through the improvement of questionnaires than through the purchase of expensive electronic spirometers. (Auth. Abs.)

**81-0463.** Shy, C. M.; Love, G. J. **Recent Evidence on the Human Health Effects of Nitrogen Dioxide.** In: Lee, S. D. (Editor). *Nitrogen Oxides and Their Effects on Health.* Michigan, Ann Arbor Science, 1980, pp. 291-305.

This chapter reviews the literature published since 1971 on the direct human health effects of nitrogen dioxide ( $\text{NO}_2$ ) at ambient concentrations and presents new epidemiological data obtained in a study of community exposure to  $\text{NO}_2$ . Three types of human response to  $\text{NO}_2$  were discussed: (1) increased airway resistance, (2) increased sensitivity to bronchoconstrictors, and (3) enhanced susceptibility to respiratory infections. Several confounding factors of the third type of response, such as parental smoking and type of fuel used for heating and cooking, were studied in children. A significant correlation was not found between parental smoking and incidence of respiratory infections in children in communities with higher illness rates. (Auth. Abs. Mod.)

**81-0464.** Sparks, P. J.; Peters, J. M. **Respiratory Morbidity in Workers Exposed to Dust Containing Phenolic Resin.** *International Archives of Occupational and Environmental Health* 45(3): 221-229, 1980.

Seventy-three men and women exposed to phenolic resin dust and/or processed cotton dust in a factory producing sound-deadening material were studied cross-sectionally. Of the 19 women, 58 percent currently smoked; and of the 54 men, 44 percent currently smoked; and 28 percent were ex-smokers. There was a statistically significant acute drop in forced expiratory volume in 1 sec ( $\text{FEV}_1$ ) and forced vital capacity (FVC) over the shift in garnett-line workers exposed to dust containing phenolic resin. Pickers, exposed to processed cotton dust only, did not show a significant drop in  $\text{FEV}_1$  and FVC over the work shift. Thirty-five percent of the workers who had smoked cigarettes and had worked in the plant 5 years or more had an  $\text{FEV}_1$  less than 80 percent of predicted. This finding was not entirely explained by duration of cigarette smoking. Multiple regression analysis revealed that the longer the duration of exposure, the lower the ratio of  $\text{FEV}_1$  to FVC. Respiratory symptoms were related to current cigarette smoking but not to duration of employment. The study suggests that exposure to dust containing phenolic resin

had both acute and chronic effects on pulmonary function. (Auth. Abs. Mod.)

**81-0465.** Spedini, C.; Dotti, A. *Le Variazioni dei Flussi Medi Espiratori in Ello in Soggetti Sani Ultrasessantenni, Fumatori e Non.* [The Variations of Mid-Expiratory Flows in Helium in Subjects Over Sixty, Smokers and Nonsmokers.] *Giornale di Gerontologia* 27(4): 257-261, April 1979, Italian.

The modifications of mid-expiratory flows have been studied after respiration of a low-density mixture composed of helium and oxygen (80:20), in 22 healthy subjects of whom 11 were smokers. The variations of flows after helium were significantly ( $p < 0.001$ ) higher in nonsmoking subjects. The results are imputable to an intrinsic obstruction of small airways, conditioned by the practice of smoking. (Auth. Abs. Mod.)

**81-0466.** Stone, D. J. *The Ventilation Response to CO<sub>2</sub> Rebreathing in Healthy Smokers, Non-Smokers and Subjects With Bronchitis.* *Bulletin of the International Union Against Tuberculosis* 54(1): 74-75, March 1979.

This paper presents the findings of a study on ventilatory responses to carbon dioxide (CO<sub>2</sub>) rebreathing in 10 smokers ( $\leq 1$  pack cigarettes/day) vs. 10 nonsmokers, and 5 older (mean age  $51 \pm 3$  years) vs. 5 younger (mean age  $21 \pm 1$  year) bronchitic subjects. Expiratory volume/peak expiratory CO<sub>2</sub> response (Ve/PeCO<sub>2</sub>) was measured and the slope determined. Ventilation, respiratory rate, and tidal volume were measured by spirometry. The differences in these values were not significant between the smokers and nonsmokers. The difference in the Ve/PeCO<sub>2</sub> response between the two age groups of bronchitic subjects was  $1.7 \pm 0.4$  in older subjects and  $3.3 \pm 0.4$  in younger subjects. The mean Ve/PeCO<sub>2</sub> in the healthy and bronchitic subjects was  $3.5 \pm 0.5$  and  $2.5 \pm 0.3$ , respectively ( $p < 0.2$ ). It is concluded that the Ve/PeCO<sub>2</sub> is not affected by subtle differences in airways function between healthy nonsmokers and smokers; however, among the few bronchitic subjects studied, the similarity in the type of ventilation response and the significant age difference indicate lung elastic recoil loss as a significant factor affecting changes in the Ve/PeCO<sub>2</sub> response curve.

**81-0467.** Sugita, K.; Ichikawa, S.; Ogihara, A.; Murabayashi, H.; Shishido, M.; Tozawa, T.; Sakakida, K.; Tezuka, K.; Fukumura, M.; Ishii, K.; Kobayashi, T.; Ohta, T.; Tomino, H.; Matsuyama, S.; Odagiri, S.; Yoshimura, R.; Kawabe, S.; Ishii, T. *Immunological Studies on Effects of Air Pollution on Respiratory Defense Functions.* *Yokohama Medical Bulletin* 30(1/4): 11-22, December 1979.

The present studies were made to compare the ability of smoking and nonsmoking patients with obstructive diseases to secrete immunoglobulins in the respiratory tract against exposure to polluted air by factory smoke and automobile

exhaust. The sputum and saliva specimens of 103 men ( $\geq 20$  years), from 4 different survey areas, were analyzed. The main air pollutants of one survey area, Tsurumi-ku, exposed to air polluted by factory smoke were sulfuric oxides (SO<sub>x</sub>) and those of other survey areas exposed to air polluted by automobile exhaust were nitric oxides (NO<sub>x</sub>). A significant decrease in albumin (Alb); IgG; total IgA, IgG, and Alb (a); and a/total protein (a/TP) in the sputum and a significant decrease of Alb/a and IgG in the saliva of smokers as compared with nonsmokers were observed ( $p < 0.05$ ). Tsurumi-ku was significantly higher than the other survey areas in IgA from sputum but not in IgA from saliva of nonsmoker patients with chronic bronchitis. Tsurumi-ku was significantly lower than the other survey areas in IgG, and IgG/a from sputum but not saliva of smokers with bronchial asthma. It is suggested that the mechanisms of action of SO<sub>x</sub> and NO<sub>x</sub> were different in smokers than in nonsmokers. (Auth. Abs. Mod.)

**81-0468.** Taveira Da Silva, A. M.; Hamosh, P. *The Immediate Effect on Lung Function of Smoking Filtered and Nonfiltered Cigarettes.* *American Review of Respiratory Disease* 122(5): 794-797, November 1980.

The effect of smoking a filtered and a nonfiltered cigarette on instantaneous maximal expiratory flow rates (Vmax<sub>50</sub> and Vmax<sub>25</sub>) and airway resistance (Raw) was measured and compared. A significant increase in Raw after both cigarettes (from  $1.99 \pm 0.44$  to  $2.53 \pm 0.60$  cm H<sub>2</sub>O/l/sec after smoking a nonfiltered cigarette, and from  $1.94 \pm 0.45$  to  $2.36 \pm 0.54$  cm H<sub>2</sub>O/l/sec after smoking a filtered cigarette,  $p < 0.001$ ), and a small decrease in Vmax<sub>50</sub> after smoking the nonfiltered cigarette (from  $5.33 \pm 1.38$  to  $5.17 \pm 1.46$  l/sec,  $p < 0.01$ ) was found. The change in Vmax<sub>50</sub> after smoking the filtered cigarette was not significant. It is suggested, on the basis of these data, that filtered cigarette smoke reduces some of the constituents that cause bronchoconstriction in the large and central airways. (Auth. Abs. Mod.)

**81-0469.** Trell, E.; Korsgaard, R.; Mattiasson, I.; Kitzing, P.; Trell, L. *Smoking, Aryl-Hydrocarbon Hydroxylase Inducibility, and Laryngeal Precancerous Lesions.* *IRCS Medical Science: Biochemistry* 8: 339, 1980.

Results of aryl hydrocarbon hydroxylase (AHH) inducibility assessments in venous blood samples of 72 patients (28 with laryngeal polypoid degeneration (Reinke's edema), 19 with chronic laryngitis, and 25 with laryngeal leukoplakia) are presented. Reference data of 102 healthy individuals were used to determine expected frequencies of AHH inducibility. Except for two patients, all were smokers with the majority being heavy smokers with a mean range of 144-195 kg total tobacco consumption. The group with laryngeal polypoid degeneration was predominantly female, had a comparatively low mean age (49.5), and showed an AHH inducibility pattern that was not significantly different from the expected normal frequency calculation. The chronic laryngitis group, predominantly male with 48.2 as the mean age, showed



significant ( $p=0.05$ ) high and low AHH inducibility. The laryngeal leukoplakia group, predominantly male with 50.9 as the mean age, also showed significant numbers of high AHH inducibility ( $p=0.05$ ). It is stated that the results appear to correspond to the clinical observation that laryngeal polypoid degeneration does not significantly increase the risk of developing cancer.

**81-0470.** Walker, J. **The Effects of Smoking and Smoking-Induced Shortness of Breath on Tests of Ventilatory Function.** Master's Thesis, University of Louisville, Kentucky, University Microfilms International 13-11838, January 1978, 59 pp.

Sixty-six smokers were divided into two groups consisting of those persons who did and did not experience persistent breathlessness while performing daily tasks. Ascertaining the homogeneity of the subgroup smokers' age and pack-year cigarette exposure, selected ventilatory function tests were performed. Subgroup smoker data were then compared with matched control data, as well as with one another. Maximal mid-expiratory flow rate, residual volume, and forced expiratory flow at 25 percent vital capacity ( $FEF_{25}$ ) each demonstrated smoker—nonsmoker differences in mean ventilatory function,  $p<0.01$ . However, smokers who did and did not complain of frequent dyspnea could not be distinguished from one another in terms of ventilatory function. Forced expiratory volume in 1 sec, residual volume/total lung capacity, and  $FEF_{25}$  did demonstrate trends toward detecting subgroup smoker differences in ventilatory function,  $0.05<p<0.10$ . While smokers could be distinguished from nonsmokers using selected tests of ventilatory function, no functional deterioration associated with persistent breathlessness in smokers could be established. (Auth. Abs.)

**81-0471.** Weinbaum, G.; Eliraz, A.; Kimbel, P. **The Stimulation of Elastase Synthesis and Release in Alveolar Macrophages Exposed to Cigarette Smoke Extract.** *Bulletin of the International Union Against Tuberculosis* 54(1): 76-77, March 1979.

See also, 81-0364, 81-0374, 81-0380, 81-0392, 81-0413, 81-0517

The effect of cigarette smoke on elastase synthesis and release in dog alveolar macrophages was studied to (1) establish if cigarette smoke exposure would result in the production and secretion of elastase, (2) determine the time course and requirements of elastase production, and (3) compare alveolar macrophages with neutrophils as elastase sources. Alveolar macrophages were cultured in medium in which cigarette smoke had been bubbled, and elastase secreted into the culture medium was assayed and quantitated. There was a rapid increase in elastase activity over 3 hours, after which time cell death caused a rapid decrease in activity. However, circulating neutrophils released  $\geq$  five times more elastase/cell than did the alveolar macrophages. Protein synthesis inhibitors cyclohexamide and colchicine reduced elastase release from alveolar macrophages by 80 and 70 percent respectively, while they had little or no effect on neutrophil elastase release. The data suggest that cigarette smoke is capable of stimulating alveolar macrophages in vitro to synthesize and secrete elastase.

**81-0472.** York, E. L.; Jones, R. L. **Effects of Smoking on Regional Residual Volume in Young Adults.** *Chest* 79(1): 12-15, January 1981.

Tests of overall lung function often reveal abnormalities in elderly smokers, but lung function is less consistently deranged in young smokers. Since airway closure at higher than normal lung volumes is thought to be an early indicator of lung dysfunction in asymptomatic smokers,  $^{133}\text{Xe}$  was used to measure regional residual volume, which is affected by airway patency, with the expectation that any abnormalities present in young smokers may be more apparent if searched for on a regional basis. No significant difference in overall lung function was found between 11 nonsmokers and 20 smokers (mean age = 23.8 years), but residual volume was significantly ( $p<0.001$ ) higher in the lower-lung regions of the smokers. The results indicate that even in young persons the lungs are functionally disturbed by smoking, and the pattern of abnormality is similar to that seen in patients with chronic obstructive lung disease. (Auth. Abs.)

## CARDIOVASCULAR DISEASES

**81-0473.** Anadere, I.; Chmiel, H.; Hess, H.; Thurston, G. B. **Clinical Blood Rheology.** *Biorheology* 16(3): 171-178, 1979.

Blood samples from 64 healthy donors, 40  $>15$  cigarettes/day smokers, and 13 patients with peripheral vascular disease were used to study the phenomenon of increased blood viscosity (due to erythrocyte aggregation) which accompanies vascular diseases and risk factors such as smoking.

This is demonstrated both for smokers and for patients with peripheral vascular disease by comparing the viscoelasticity of the blood with that from healthy donors ( $p<0.01$  and  $p<0.0005$ , respectively). Also, the hematocrit values measured by centrifugation for the smokers and patients were found to be significantly higher than for the healthy donors ( $p<0.25$  and  $p<0.005$ , respectively), this difference being attributed to the effects of aggregation. A new unit, the

calculated hematocrit, is recommended. This unit, calculated from measured values of blood and plasma densities, is independent of the conditions of aggregation. (Auth. Abs. Mod.)

**81-0474.** Aronow, W. S. **Effect of Carbon Monoxide on Cardiovascular Disease.** *Preventive Medicine* 8(3): 271-278, May 1979.

Carbon monoxide exposure from heavy smoking or heavy atmospheric carbon monoxide pollution depresses myocardial function in patients with coronary heart disease, aggravates angina pectoris, aggravates intermittent claudication of the calf or thigh, increases myocardial ischemia in patients with clinical and subclinical coronary heart disease, and contributes to an increased incidence of nonfatal and fatal myocardial infarction and sudden death from coronary heart disease. Carbon monoxide contributes to the increase in nonfatal and fatal myocardial infarction and in sudden death from coronary heart disease in cigarette smokers by (1) carboxyhemoglobin interfering with myocardial oxygen delivery at the time nicotine has caused an increase in myocardial oxygen demand, aggravating an episode of myocardial ischemia, (2) the negative inotropic effect of carboxyhemoglobin aggravating an attack of myocardial ischemia, (3) carboxyhemoglobin reducing the threshold for ventricular fibrillation during an episode of myocardial ischemia, and (4) carboxyhemoglobin increasing platelet stickiness, thereby increasing a thrombotic tendency. Furthermore, experimental data indicate that exposure to carbon monoxide in concentrations found in heavy tobacco smokers or in persons with heavy occupational exposure to carbon monoxide plays a role in the pathogenesis of cardiovascular disease. (Auth. Abs.)

**81-0475.** Astrup, P.; Kjeldsen, K. **Model Studies Linking Carbon Monoxide and/or Nicotine to Arteriosclerosis and Cardiovascular Disease.** *Preventive Medicine* 8(3): 295-302, May 1979.

The cardiovascular effects of animal exposure to carbon monoxide and/or nicotine are surveyed. The myocardial effects are produced by carbon monoxide as well as nicotine and lead to decreased myocardial oxygen tensions with compensatory increases in coronary blood flow. There is an increased tendency to arrhythmia. Carbon monoxide exposure leads to degenerative changes and partial necrosis of myofibrils, similar to the changes observed after hypoxia. After nicotine exposure, moderate fibrosis and calcification may be seen in arterial media, although no injuring effects on intima have been observed. The effects of carbon monoxide exposure on arterial intima have been reevaluated, and previous findings of arterial intimal changes have not been confirmed. It is concluded that tobacco smokers' enhanced risk of heart infarct is caused by the myocardial effects of nicotine and carbon monoxide. The structural changes in the arterial media probably are caused primarily by nicotine, and secondarily by carbon monoxide. The compounds responsible

for the enhanced intimal changes in the smokers are not identified with certainty, but may be related to carbon monoxide induced changes in cholesterol metabolism. (Auth. Abs.)

**81-0476.** Auerbach, O.; Garfinkel, L. **Atherosclerosis and Aneurysm of Aorta in Relation to Smoking Habits and Age.** *Chest* 78(6): 805-809, December 1980.

A direct relationship between the extent of atherosclerotic lesions and smoking habits and age was found in a study of 1,412 aortas collected at autopsy from male patients from 1965 to 1970. The extent of the lesions was recorded using grading systems for formation of plaques, ulceration, and calcification. These findings increased with the number of cigarettes smoked and were greater in ex-cigarette smokers and pipe or cigar smokers than in nonsmokers. More extensive alterations were found in the abdominal aorta than in the thoracic aorta. Aneurysms were found eight times more frequently among those smoking 1-2 packs of cigarettes/day than in nonsmokers. Black subjects showed about one-half the number of aneurysms and fewer extensive atherosclerotic lesions than white subjects. At ages over 65 years, abdominal aortic aneurysms were found in 11 percent of all men and in 16 percent of the heavy ( $\geq 2$  packs/day) smokers. (Auth. Abs.)

**81-0477.** Beach, K. W.; Strandness, D. E., Jr. **Arteriosclerosis Obliterans and Associated Risk Factors in Insulin-Dependent and Non-Insulin-Dependent Diabetes.** *Diabetes* 29(11): 882-888, November 1980.

The prevalence of arteriosclerosis obliterans (ASO) of the legs was determined by a battery of noninvasive tests in 141 insulin-dependent (IDDM) and 289 non-insulin-dependent diabetic subjects (NIDDM) and in 64 other subjects. The prevalence of detectable ASO ranges from 18 percent in the younger IDDM group to 41 percent in the diet-treated NIDDM group. The prevalence of ASO increases 7.5 percent per decade, appears to increase 6.5 percent in the age-adjusted IDDM group, 9 percent in males, 19 percent in those with hypertension, and 12 percent in smokers. In the 49 patients with segmental disease, all but one had been a smoker. In the 96 patients with an abnormal ankle/arm pressure ratio, 78 had smoked (81 percent) compared with 219 of 384 (57 percent) without ASO,  $p < 0.00005$ . Among those with a history of smoking, those who stopped smoking at least 2 years before examination had a 30 percent lower prevalence of detectable ASO than those who continued to smoke. If the more severe disease categories are considered, some interesting relationships appear. In those patients with segmental disease, the prevalence is 19 percent in the current smokers and 9 percent in those who had stopped ( $p = 0.0206$ ). Considering decreased ankle BP, 32 percent of current smokers are abnormal as compared with 20 percent of those who had stopped ( $p = 0.0188$ ). No consistently significant correlations with fasting glucose, glycosylated hemoglobin, or

obesity were found. After accounting for the effect of smoking, the increased risk for ASO in males becomes nonsignificant. (Auth. Abs. Mod.)

**81-0478.** Bell, J. Ischaemic Heart Disease In Smokers. (Letter). *Journal of Epidemiology and Community Health* 34(2): 156, June 1980.

In response to an article suggesting that the decrease in relative risk of ischemic heart disease (IHD) with age for smokers as compared to nonsmokers may be due to some smokers' susceptibility to heart disease or to complex interactions with environmental factors (*Journal of Epidemiology and Community Health* 33(4): 243-247, December 1979), a model of IHD death rates found in a study of British doctors is presented which appears to agree with the reported decrease. The model uses absolute rather than relative risk to predict a decrease in excess risk with age per cigarette smoked/day. The reason for the decline as suggested by the model indicates that the risk per cigarette/day remains constant, whereas the aging effect becomes so large in older men that smoking contributes very little to the risk. See also 80-1464.

**81-0479.** Bocanegra, T. S.; Espinoza, L. R. Raynaud's Phenomenon in Passive Smokers. (Letter). *New England Journal of Medicine* 303(24): 1419, December 11, 1980.

A case of Raynaud's phenomenon caused by passive smoking is reported. The patient was a 47-year-old woman who had never smoked but whose husband (who also suffered from a mild case of the same disorder) had smoked 4.5 packages of cigarettes daily for more than 30 years. When he smoked no more than two packs of cigarettes daily in separate rooms only, the patient's symptoms disappeared within 2 weeks, but the husband's persisted.

**81-0480.** Boutet, M.; Bazin, M.; Turcotte, H.; Lagace, R. Effects of Cigarette Smoke on Rat Thoracic Aorta. *Artery* 7(1): 56-72, 1980.

Using the fine structural macromolecular tracer horseradish peroxidase (HRP), the permeability of thoracic aorta was studied in 72 male Sprague-Dawley rats. Rats were exposed to cigarette smoke for 1 day (acute effect), 14 days (subacute effect), and 15 weeks (chronic effect). Thoracic aorta sections from control rats and sham smokers were free of HRP reaction product. In smoke-exposed thoracic aortas, permeability to peroxidase increased proportionately to the increase in length of the exposure duration. Furthermore, thoracic aortas of smoke-exposed rats exhibited focal vacuolar dilations (subendothelial blebs) and an increased number of subendothelial macrophages. (Auth. Abs. Mod.)

**81-0481.** Bruppacher, R.; Staehelin, H. B. Blutdruck und Rauchgewohnheiten in der Adoleszenz. [Blood Pressure and

Smoking Habit in Adolescents.] *Sozial- und Praeventivmedizin* 25(4): 166-167, September 1980, German.

Measurements of systolic and diastolic blood pressure were made in a population of 14- to 16-year-old boys and girls in 1974 and again in 1978 when they were 18-20 years old. A comparison of the two sets of data suggests that beginning of smoking is associated with a 3-4 mm Hg lower blood pressure. Blood pressure in adolescents who started smoking at 14-16 years of age increases later than in nonsmoking adolescents, to attain the same level as in nonsmokers 18-20 years of age. In subjects who began smoking at ages 16-20, blood pressure level became lower than in nonsmokers at the time of the second study (in 1978). Presumably, the decrease in blood pressure associated with the beginning of smoking is only temporary.

**81-0482.** Burkart, F.; Meier, C.; Gutzwiller, F.; Moret, P.; Baumann, P. C.; Ratti, R.; Salzmann, C.; Rivier, J.-L.; Sigwart, U. Die Koronare Herzkrankheit beim jungen Patienten unter 35 Jahren in der Schweiz. Rundtischgespräch. [Coronary Heart Disease in the Young Patient Under 35 Years in Switzerland, Roundtable Discussion.] *Schweizerische medizinische Wochenschrift* 110(45): 1631-1643, November 8, 1980, German.

Young patients (174 men and 11 women) under the age of 35 years who had had myocardial infarction or angina and in whom selective coronary angiography had been performed were included in a retrospective study. In these 185 patients the importance of the risk factors could be demonstrated. It was found that almost 80 percent had been smokers (i.e., smoked >10 cigarettes/day), 50 percent had been obese, and the percentage of positive family history and of hyperlipidemia was elevated compared with an age-matched control group. Angiography showed predominantly one-vessel disease, the anterior descending branch being affected in 52 percent. Few complications after myocardial infarct were observed and 30 percent of the group underwent surgery mainly for angina. The operative risk is low due to the youth and generally good general condition of these patients. (Auth. Abs. Mod.)

**81-0483.** Carlsen, J. E.; Svendsen, T. L.; Christensen, N. J.; Trap-Jensen, J. Rygning og Adrenerg Beta-Receptorblokkade. [Cigarette Smoking and Beta-Adrenergic Receptor Blockade.] *Ugeskrift for Laeger* 142(8): 504-508, February 18, 1980, Danish.

The cardiovascular, adrenergic, and metabolic effects of cigarette smoking after rapid administration of isotonic saline (placebo), propranolol 0.1 mg/kg, and atenolol 0.1 mg/kg were studied in a double-blind crossover trial in seven young healthy smokers. Blood pressure, heart rate, and forearm blood flow were measured before and after administration of the above mentioned preparations, and during and after a 15-min smoking period. Blood for measurement of plasma

catecholamines, glucose, lactate, and free fatty acids (FFA) was collected during the investigation. During smoking, the plasma adrenaline concentration increased markedly and equally in all three experimental situations, whereas no changes in noradrenaline were seen. In the placebo study, smoking was associated with a rise in systolic and diastolic blood pressure and in forearm blood flow. Both beta blockers uniformly decreased heart rate at rest and the rise in heart rate during smoking. Propranolol caused an augmented rise in diastolic blood pressure and a fall in forearm blood flow compared with the placebo and the atenolol study. In the atenolol study, the rise in systolic blood pressure and heart rate were diminished compared with the placebo study. During smoking, blood glucose rose equally in all three experimental situations. There were no changes in lactate concentrations. The rise in FFA was equal in the placebo and the atenolol study, whereas no changes were seen after propranolol. The present findings appear to favor the use of selective beta-1 blockade in cigarette-smoking patients requiring beta adrenoceptor blocking agents. (Auth. Abs. Mod.)

**81-0484.** Cronenwett, J. L.; Davis, J. T., Jr.; Gooch, J. B.; Garrett, H. E. Aortoiliac Occlusive Disease in Women. *Surgery* 88(6): 775-784, December 1980.

Seventy-five women with aortoiliac (A-I) occlusive disease requiring vascular reconstruction during the past 4 years were reviewed. They represented a growing proportion (39 percent) of all patients with A-I disease and presented at the same mean age (57 years) as males. Standard cardiovascular risk factors were high in this group and cigarette smoking was especially predominate (93 percent) with a 47 pack-year mean smoking history. Women presented with elevated triglyceride levels as opposed to increased cholesterol, with frequent type IV hyperlipoproteinemia. An operative mortality rate of 0 percent, a 4-year graft limb patency of 94 percent, and a 4-year life-table survival of 93 percent were observed. All patients were strongly advised to stop smoking by their surgeons. At followup, 28 percent had stopped smoking, 33 percent had decreased smoking by more than half, 17 percent had decreased by less than half, and 22 percent had unchanged smoking levels. Good or excellent long-term relief of symptoms occurred in 96 percent of patients despite tandem (superficial femoral) disease in 42 percent, but only 4 percent superficial femoral reconstruction. A definition of women with "small vessels" was established by using aortic diameter  $< 1$  S.D. below the overall mean ( $< 4$  cm diameter at the aortic bifurcation). Women in this subgroup presented at a younger age with less severe symptoms, fewer risk factors, and more localized disease. An emphasis on postoperative reduction of cigarette smoking and dietary modification among hyperlipidemic patients probably contributed to the satisfactory results achieved in this increasing percentage of women with A-I occlusive disease. (Auth. Abs.)

**81-0485.** Dressendorfer, R. H.; Amsterdam, E. A. An Approach to Preventive Cardiology in Asymptomatic, Sedentary Adults. *Cardiology* 66(4): 204-222, 1980.

One of the early, well-established coronary prevention programs, the Adult Fitness Program at the University of California, Davis, provides an 8-year record of experience in exercise stress testing and exercise prescription with asymptomatic, sedentary adults. It is stated that an individually prescribed exercise training plan coupled with preventive health education typically leads not only to improved cardiovascular fitness, but also to a favorable modification of coronary risk factors. For example, the percent change in smoking and passive smoking was negative 63.6 percent. This paper describes the approach to cardiorespiratory health and fitness evaluation in an apparently normal population. (Auth. Abs. Mod.)

**81-0486.** Dwyer, T.; Hetzel, B. S. A Comparison of Trends of Coronary Heart Disease Mortality in Australia, USA and England and Wales With Reference to Three Major Risk Factors—Hypertension, Cigarette Smoking and Diet. *International Journal of Epidemiology* 9(1): 65-71, 1980.

A comparison has been made of the recent changes in coronary heart disease mortality in Australia, the United States, and in the United Kingdom (England and Wales). Sharp declines in mortality dating from 1966 in Australia and from 1968 in the United States in both sexes contrast with a persistent increase in male mortality rates in England and Wales until 1972 (after which a slight decrease occurred) and a consistent slight decrease in female mortality rates since 1950. An investigation has been made of changes in three major risk factors—hypertension, cigarette smoking, and diet in the three countries in an attempt to determine to what extent such changes might correlate with the different patterns of mortality. There has been a progressive and similar decline in mortality due to hypertension in both sexes in all three countries since 1950. There was an increase in cigarette smoking in all three countries from 1947 followed by a decline in the United States from 1963 and a more recent

81-0487. Gori, G. B. Summary of the Workshop on Carbon Monoxide and Cardiovascular Disease, Berlin, October 10-12, 1978. *Preventive Medicine* 8(3): 404-406, May 1979.

A conference workshop on carbon monoxide (CO) and cardiovascular disease held in Berlin in 1978 is summarized. It is concluded that CO exposure in normal individuals who appear to compensate for acute effects (e.g., elevated carboxyhemoglobin levels) may be without chronic consequences. However, it is recommended that in vivo studies utilize animal models such as dogs or higher primates for chronic exposure studies, and human volunteers for acute exposure studies. In addition, it is recommended that in vitro studies utilize organ and tissue cultures of specific target cells for study of such areas as respiration, endothelial structure and function, and cholesterol and lipoprotein transport.

81-0488. Gruppo di Ricerca del Progetto Romano di Prevenzione Della Cardiopatia Coronarica. Il Rischio Stimato di Cardiopatia Coronarica in Quattro Popolazioni Lavorative: Il Progetto Romano di Prevenzione Della Cardiopatia Coronarica. [The Estimated Risk of Coronary Heart Disease in Four Working Population Groups: The Rome Project of Coronary Heart Disease Prevention.] *Giornale Italiano di Cardiologia* 8(10): 1135-1142, October 1978, Italian.

Within four middle-aged population groups enrolled in the Rome Project of Coronary Heart Disease Prevention, a theoretic estimation of coronary heart disease (CHD) incidence in 5 years has been made on the basis of some risk factors (age, systolic blood pressure, serum cholesterol, smoking habit, physical activity at work, body mass index), employing four different solutions of the multiple logistic function (MLF) derived from previous population studies and a simple risk score adopted by the WHO European Collaborative Group to which this study belongs. The use of different MLF solutions provides rather different levels of estimated incidence, but the ranking and the relative risk between population groups are substantially constant and little dependent on the different solutions. Moreover, an acceptable similarity has been found in terms of estimated risk between the pool of the treatment and that of the control population groups (ratio between 0.97 and 1.09). A reasonable hypothesis indicates that in the absence of preventive action the annual incidence of severe CHD (hard criteria) should be around 6/1,000. The estimation of the relative risk within single population groups allows identification of a strata of people with different risks which suggests, again in the absence of any preventive action, a concentration of 25 to 30 percent of all new cases of disease in 10 percent of the population and about 40-45 percent in 20 percent of the same. (Auth. Abs.)

81-0489. Gupta, S. P.; Gupta, M. S.; Moga, R. L. Smoking as a Coronary Risk Factor—Comparative Evaluation of Cigarette Paper and Bidi Leaf. *Indian Journal of Medical Sciences* 34(7): 163-167, July 1980.

The effects of cigarette paper vs. bidi leaf combustion products (using the identical quantity of bidi tobacco) on some parameters (platelet aggregation, serum free fatty acids, and carboxyhemoglobin levels) which are known to be related to the pathogenesis of coronary heart disease were studied in 20 male chronic smokers. An almost identical effect on platelet aggregation and serum free fatty acids was observed. The rise in carboxyhemoglobin level was somewhat greater after smoking cigarettes wrapped in bidi leaf rather than cigarette paper. This difference is possibly related to lesser porosity and poor combustibility of bidi leaf compared to cigarette paper. (Auth. Abs. Mod.)

81-0490. Hartia, L.; Zamfirescu, N. R.; Mihailescu, V. Considerations sur Certains Facteurs de Risque de la Cardiopathie Ischemique Chez les Ages Avec Infarctus Ancien du Myocarde. [Certain Risk Factors of Ischemic Heart Disease in the Aged With Previous Myocardial Infarction.] *Physiologie* 16(2): 149-154, 1979, French.

Serum cholesterol, arterial blood pressure, glycemia, and smoking habits have been determined in 46 male and 34 female subjects, averaging 72.1 years, whose electrocardiogram or vectorcardiogram showed signs of a previous myocardial infarction. Elevated serum cholesterol levels (higher than 250 mg percent) were found in 47 percent of the female and 26 percent of the male subjects (average 22.9 mg percent). Arterial hypertension was found in 45.1 percent of the male and 44.1 percent of the female subjects. Only 3 percent of the females but 22 percent of the males had been smoking over 20 cigarettes/day. Of both men and women, 11 percent were diabetics. A multifactor etiology of ischemic heart disease is stressed. It is believed that advanced age causes more serious changes than the other major risk factors.

81-0491. Holmes, W. L. The Multiple Risk Factor Intervention Trial. In: Gotto, A. M., Jr.; Smith, L. C.; Allen, B. (Editors). *Atherosclerosis V*. New York, Springer-Verlag, 1980, pp. 504-508.

The Multiple Risk Factor Intervention Trial (MRFIT) is a randomized, non-double blind clinical trial of the efficacy of multiple risk factor modification (e.g., elevated blood cholesterol, elevated blood pressure, and cigarette smoking) for the reduction of coronary heart disease mortality. In order to determine if reasonable risk factor reduction was attained in an MRFIT group, the following specific goals for risk factor modification at 12 and 24 months were made: (1) 10 percent reduction from baseline in serum cholesterol for those with levels  $\geq 220$  mg/dl, (2) 10 percent reduction from baseline in diastolic blood pressure (DBP) of  $\geq 90$  mm Hg, and (3) 20, 30, or 40 percent net reduction in amount of cigarette smoking for heavy, moderate, or light smokers, respectively. Of a total of 12,866 men, 6,428 were assigned to the special intervention (SI) group and 6,438 to the usual care (UC) group. The UC group were referred to their usual source of medical care. The SI group attended 8-10 2-hr intervention

sessions/week. The session strategies combined lectures, behavior modification, group dynamics, and group process. Upon completion of the intervention phase, SI participants were seen at 4-month intervals, and UC participants at 1-year intervals. The reported quit rates for all smokers at 12 and 24 months were 43.1 and 44.1 percent, respectively, exceeding expectation. At 24 months 63.8 percent had attained goal DBP and 81.8 percent had attained  $<90$  mm Hg. The average reduction in serum cholesterol was less than that predicted. Finally, one of the major MRFIT accomplishments was found to be good attendance at the 24-month visit (UC-93 percent, SI-94 percent).

**81-0492.** Janson, R.; Neuhaus, G.; Thelen, M. *Extrakranielle arterielle Verschlusskrankung bei gefasschirurgischen Patienten mit peripheren Durchblutungsstörungen.* [Extracranial Arterial Occlusive Disease in Arteriopathic Patients With Peripheral Vascular Disorders.] *Fortschritte auf dem Gebiete der Röntgenstrahlen und der Nuklearmedizin* 133(5): 484-493, November 1980, German.

Peripheral aortography and angiography of the aortic arch were carried out in 152 male and 24 female patients with peripheral arterial occlusive disease. The risk of extracranial occlusive disease (cerebrovascular insufficiency) was shown to increase when the peripheral occlusive disease manifested itself at more than one arterial level. Cigarette smoking, a risk factor for arteriosclerosis, was found in 88.8 percent of all patients. Of the 112 patients (63.6 percent of the total sample) with hemodynamically relevant stenoses or occlusions of the supra-aortic vessels, 55.6 percent were smoking more than 10 cigarettes/day. At least 54 and at most 72 percent of all patients exhibited both hemodynamically relevant peripheral and supra-aortic changes. A statistically significant correlation was established between the clinical severity of cerebrovascular insufficiency and that of the peripheral arterial occlusive disease.

**81-0493.** Jesse, M. J. *Cigarette Smoking: A Risk Factor for Atherosclerosis in Childhood?* In: Gotto, A. M., Jr.; Smith, L. C.; Allen, B. (Editors). *Atherosclerosis V*. New York, Springer-Verlag, 1980, pp. 278-281.

It is stated that three issues are pertinent in discussing cigarette smoking as a risk factor for atherosclerosis: (1) the evidence linking smoking to atherosclerosis development, (2) the relationship between smoking and coronary artery, cerebrovascular, and peripheral vascular disease incidence, and (3) the potential positive relationship between (1) and (2) in terms of risk factor removal from the population. Relevant autopsy studies, prospective studies, and animal studies are mentioned, as are reports concerning myocardial infarction in women who smoke and take oral contraceptives. The phenomenon of decreased adult and increased teenage smoking since the 1964 Surgeon General's report on smoking and health is then discussed in view of the study evidence. It is stated that efforts toward preventing the onset of smoking

have not been extremely successful and that a more effective approach might be to eliminate this risk factor at the outset, although the appropriate methodology is not currently available.

**81-0494.** Maron, M. B.; Rickaby, D. A.; Dawson, C. A. *Adrenal Component to Pulmonary Hypertension Caused by Nicotine Administration in the Dog.* *Journal of Applied Physiology* 49(1): 66-72, 1980.

In this study, the possibility was investigated that the adrenal gland contributes to nicotine-induced pulmonary hypertension. A canine left lower lung lobe (LLL) preparation was used that was pump-perfused with mixed venous blood at constant flow and outflow pressure. Main pulmonary artery, left atrial, and LLL arterial pressures were monitored to assess the responses of the animal's intact right lung and isolated LLL. With the adrenal venous return intact, injection of 10-26  $\mu\text{g/kg}$  nicotine into the left ventricle or ascending aorta resulted in a 42 percent increase in LLL arterial pressure and a 70 percent increase in the pulmonary arterial-left atrial pressure gradient (Ppa-Pla). When the adrenal venous return was interrupted, the increases in LLL arterial pressure and Ppa-Pla were reduced to 6 and 10 percent, respectively. The LLL response could be eliminated by  $\alpha$ -adrenergic receptor blockade, suggesting that adrenal catecholamines may contribute to the pulmonary hypertension induced by nicotine infusion. (Auth. Abs.)

**81-0495.** Menotti, A.; Signoretti, P.; Zanchi, E. *Predizione e Prognosi Della Cardiopatia Ipertensiva. Esperienza Epidemiologica.* [Prediction and Prognosis of Hypertensive Heart Disease. Epidemiological Experience.] *Minerva Cardioangiologica* 26(11): 697-704, November 1978, Italian.

The prevalence of hypertensive heart disease was measured in three samples of men aged 45-64 (total of 2,260 men) and was found to be 2.21 percent (50 cases). Clinical diagnosis in most cases was based on four of five symptoms and/or signs. The electrocardiogram was abnormal in 66 percent of cases. Age and relative body weight, skinfold findings, and systolic and diastolic arterial pressure measured 5 years before the diagnosis proved to be risk factors for the onset of the disease, whereas serum cholesterol, cigarette smoking, and physical activity at work did not appear to be predictive. In the 5 years after diagnosis, the risk run by these patients was three times higher than that of the remaining population for cardiovascular and general mortality and about twice as high as the development of other nonfatal cardiovascular conditions. (Auth. Abs. Mod.)

**81-0496.** Morris, J. N.; Pollard, R.; Everitt, M. G.; Chave, S.P.W.; Semmence, A. M. *Vigorous Exercise in Leisure-Time: Protection Against Coronary Heart Disease.* *Lancet* 2(8206): 1207-1210, December 6, 1980.

A total of 1,138 first clinical episodes of coronary heart disease (CHD) in 17,944 middle-aged male office workers in the British Civil Service are reported. Men who engaged in vigorous sports or heavy work during an initial survey in 1968-70 had an incidence of CHD in the next 8.5 years somewhat less than half that of their colleagues who recorded no vigorous exercise (VE). The CHD rates of men who took such VE were lower in both fatal and nonfatal clinical manifestations, though more so in fatal; throughout the age-range studied, though more striking in later middle age and early old age; and in all other subgroups examined, including those with a family history of CHD, the obese, the short of stature, cigarette smokers, and men with severe hypertension and subclinical angina, as well as in those in favorable or neutral situations for CHD. Comparing first attacks of CHD with VE sports in cigarette smokers and non-cigarette smokers; in the prior group 4.9 percent reported VE sports while 9.7 percent didn't, and in the latter group 2.1 percent reported VE sports while 5.0 percent didn't. The generality of the advantage suggests that VE is a natural defense of the body, with a protective effect on the aging heart against ischemia and its consequences. (Auth. Abs. Mod.)

**81-0497.** Oliver, M. F. (Editor). *Coronary Heart Disease in Young Women*. Edinburgh, Churchill Livingstone, 1978, 271 pp.

The incidence of coronary heart disease (CHD) in young women has become almost epidemic over the last 20 years. This book contains papers presented at a symposium on the subject and is subdivided into seven sessions: (1) epidemiology, (2) arterial wall, (3) endocrine pathophysiology, (4) CHD risk factors in young women, (5) oral contraceptives and estrogens, (6) CHD, and (7) future recommendations for prognosis and management of CHD in women under 45 years. Each session is followed by participant discussion. If family history provides evidence of CHD, it is advised that the young woman be a lifelong nonsmoker; never take an oral contraceptive, even the 30µg estrogen kind; be monitored for carbohydrate tolerance and hyperlipidemia; and never be fat.

**81-0498.** Perani, G.; Ranieri, M. G.; Zawaideh, Z.; Rampini, C.; Martignoni, A.; Ferremi, L. *Effetto del Fumo e dei Contraccettivi Orali sul Livello Sierico di HDL-Colesterolo Nella Giovane Donna.* [The Effect of Smoke and Oral Contraceptives on Serum HDL-Cholesterol Levels in Young Women.] *Progresso Medico* 35(24): 1031-1036, 1979, Italian.

Serum high density lipoprotein (HDL) cholesterol and total cholesterol levels have been measured in 72 healthy female volunteers, aged 20-30. Both mean HDL-cholesterol and mean ratio of HDL-cholesterol to total cholesterol (HDL/TC) are significantly lower in smokers than in non-smokers; a significant inverse relation exists between the number of cigarettes smoked and the ratio HDL/TC. Oral contraceptives, too, are associated with mean levels of HDL-

cholesterol and of ratio HDL/TC significantly lower than controls; such changes, however, are less evident for contraceptives containing 30µg rather than 50µg estrogen. The results of the present study indicate that both smoking and oral contraceptives negatively affect the way cholesterol is removed from tissues, thus contributing an accelerated atherogenic process in young women. (Auth. Abs.)

**81-0499.** Piantadosi, F. R.; Cuomo, A.; Pisani, P.; Esposito, F.; Scotti di Tella, R. *Arteriopatia Periferica Diabetica e Fattori di Rischio ad Essa Correlati.* [Diabetic Peripheral Arteriopathy and Correlated Risk Factors.] *Rassegna Internazionale di Clinica e Terapia* 58(19): 1345-1350, October 15, 1978, Italian.

The incidence of peripheral arteriosclerosis of the limbs was evaluated in 62 cases of diabetic patients (34 females, 28 males) by the inclination time test (inclination time of the digital photoplethysmographic wave). Contrary to what occurs in atherosclerotic vascular diseases, peripheral arterial disease of limbs in diabetic patients does not show a greater prevalence for males. It is emphasized that diabetic smokers (n=29) show an inclination time significantly more prolonged than nonsmokers (n=33) (i.e., 150 vs. 138 msec, respectively,  $p < 0.05$ ), and that the existence of the peripheral diabetic angiopathy is significantly connected to cholesterolemia and to triglyceridemia, while it is not significantly connected to the body mass index and to systo-diastolic blood pressure. (Auth. Abs. Mod.)

**81-0500.** Prachar, H.; Pollak, H.; Arnoldner, O.; Dittel, M.; Kiss, E.; Nobis, H.; Spiel, R.; Enenkel, W. *Die Bedeutung der Risikofaktoren für den Verlauf des Myokardinfarktes.* [Importance of Risk Factors in Myocardial Infarction.] *Zeitschrift fuer Kardiologie* 69(11): 782-789, November 1980, German.

The importance of risk factors such as hypertension, hyperlipidemia, diabetes mellitus, and cigarette smoking (because of hemodynamic and other complications during acute myocardial infarction), and the effect of quality of life during the first year after myocardial infarction were pointed out in this study. No risk factor was found in 12.1 percent out of 248 patients, 25.8 percent had one, 33.5 percent two, 12.9 percent three, and 3.2 percent four risk factors. If only one risk factor for coronary heart disease was considered, cigarette smoking was most common (35.9 percent). If there were two risk factors, most of the people had diabetes mellitus and hypertension; and the combination diabetes mellitus, hyperlipidemia, and cigarette smoking was most common if three risk factors were present. The mean age of all patients was  $65.9 \pm 10.8$  years. Patients who smoked or had hyperlipidemia were statistically significantly younger ( $p < 0.001$ ). There was no correlation between type or number of risk factors and pulse frequency, cardiac index, pulmonary artery pressure, and third heart sound during the acute phase of myocardial infarction. Also, no correlation was found between the risk factors hypertension, diabetes mellitus, and cigarette smoking

and rhythm disturbance or reinfarction. Patients with normal lipids had significantly more bradycardia or tachycardia than patients with hyperlipidemia ( $p < 0.05$ ). Patients without diabetes mellitus or hypertension had better exercise tests than patients with these risk factors ( $p < 0.01$ ). Of the hypertensive patients, 92 percent took their medication regularly, 14.1 percent of the smoking patients continued smoking cigarettes even after acute myocardial infarction. Only 62.1 percent of the diabetic patients, 54.1 percent of the hyperlipemic patients, and 40 percent of the overweight patients adhered to their diet. Because of poor patient compliance there was no exact information possible in predicting the value of secondary preventive measurements after acute myocardial infarction. (Auth. Abs. Mod.)

**81-0501.** Prat, A. G.; Guzman, R. R.; Silva, O. L.; Chamorro, G. *Riesgo de Enfermedad Cardiovascular en un Grupo de Trabajadores Sedentarios. [Risk of Cardiovascular Disease in a Sedentary Working Population.] Revista Medica de Chile* 106(9): 682-685, September 1978, Spanish.

In order to estimate the risk of cardiovascular disease (CVDR) in a Chilean working population, a random sample of 210 sedentary males (46 percent of whom were smokers) employed at the National Petroleum Corporation was studied. The multivariate equation developed in the Framingham Study was used to estimate the 8-year CVDR from the individual values of age, serum cholesterol, systolic blood pressure, smoking habit, presence of glucose intolerance, and left ventricular hypertrophy. CVDR was then compared to that of the Framingham population for groups of similar age. For ages 40, 45, and 50 years, CVDR for this study vs. the Framingham Study was 3.4 vs. 4.1 percent, 4.8 vs. 7.5 percent, and 10.5 vs. 11.5 percent. The age-adjusted mean CVDR was significantly, but only slightly, lower in our population (7.8 vs. 9.6 percent). In part, this difference may be explained by lower serum cholesterol levels in the study population. These preliminary results suggest that CVDR may be as high in Chile as it is in the United States. Long-term followup will be needed to verify whether calculated CVDR accurately predicts the appearance of clinical cardiovascular events. (Auth. Abs. Mod.)

**81-0502.** Raeder, E. A.; Burekhardt, D.; Perruchoud, A.; Blum, P.; Amrein, R.; Herzog, H. *Akute hamodynamische Veränderungen nach Zigaretten- und Zigarrenrauchen sowie nach Kohlenmonoxydinhalation. [Acute Hemodynamic Changes After Smoking and Carbon Monoxide Inhalation.] Therapeutische Umschau* 37(2): 91-95, 1980, German.

The effects of smoking and inhalation of carbon monoxide (CO) on the systolic time intervals and blood pressure were examined in 10 healthy smokers with a mean age of 24.3 years. Each subject smoked a low-nicotine cigarette with a ventilated filter (0.1 mg nicotine, 1.1 vol. percent CO), and a high-nicotine plain cigarette (2.6 mg nicotine, 4.5 vol. percent CO), as well as a cigar. Cigar smoke was not inhaled. The

product heart rate x blood pressure was increased and the left ventricular ejection time index (LVET<sub>i</sub>) prolonged following smoking the high-nicotine cigarette, whereas changes after smoking the low-nicotine cigarette and the cigar were not as pronounced. These changes are presumably caused by nicotine-induced catecholamine release. Inhalation of CO did not affect cardiac performance acutely as shown by unchanged systolic time intervals. When a high-nicotine cigarette was smoked after the subject received a beta blocker, a significant prolongation of the pre-ejection period index (PEP<sub>e</sub>) occurred as a result of the increased afterload. Thus, the effects of catecholamines on parameters of myocardial contractility (PEP<sub>e</sub>, PEP/LVET) were presumably offset by the increased afterload. It is concluded that the acute hemodynamic changes of smoking in healthy subjects depend upon the amount of nicotine absorbed. (Auth. Abs.)

**81-0503.** Rywik, S.; Kuzminska, A.; Bankowska, M.; Wagrowska, H.; Mering, E.; Magdon, M.; Kozek, E.; Mizera, R.; Idzior, B.; Nowakowska, J. *Częstosc Występowania Niedokrwiennnej Choroby Serca w Wybranych Podgrupach Populacji Polski Oraz Ocena Związku Między Chorobowością Spowodowaną tą Przyczyną a Wybranymi Czynniki Ryzyka. [The Prevalence of Ischemic Heart Disease in Chosen Subgroups of the Polish Population and Relationship Between This Prevalence and Risk Factors.] Przegląd Lekarski* 36(10): 729-735, 1979, Polish.

The purpose of the study was to estimate the prevalence of ischemic heart disease (IHD) in male employees 40-59 years of age from factories in Warsaw and in South Poland, as well as the relationship between this prevalence and risk factors. Of 9,927 males covered by the study, 8,758 persons were screened (response rate 88.2 percent); 5,692 were employed in Warsaw and 3,066 in South Poland. The diagnosis of IHD was established by symptoms of angina or ischemic changes in the electrocardiogram (ECG) at rest. The disease was found in 8.0 percent of those screened, with no significant differences between those from Warsaw and South Poland ( $p > 0.05$ ). The prevalence of angina was significantly higher among those in South Poland, whereas the prevalence of ischemic changes was higher among those in Warsaw ( $p < 0.05$ ). A positive relationship was found between IHD and hypertension, obesity, physical inactivity, or high risk score, regardless of age. No relationship was found between



comparison of the incidence of myocardial infarction between North European countries and the countries of Southern Europe showed a significant difference: a north-south gradient. The survival rate of men <65 years 1 year after infarction was 59 percent. It is noted that many of the patients in the 4 weeks prior to infarction had no subjective cardiac symptoms. At the time of first infarction, 60 percent of the men were smokers. At the time of reinfarction, 25 percent were smokers. As part of our primary prevention program, 14 general practitioners conducted a fitness program for risk patients. After 1 year there was a decrease of average values, of 13 percent for uric acid, 17 percent for cholesterol, and 25 percent for triglycerides.

**81-0505.** Scott, D. W.; Gorry, G. A.; Hoffman, R. G.; Barboriak, J. J.; Gotto, A. M. A New Approach for Evaluating Risk Factors in Coronary Artery Disease: A Study of Lipid Concentrations and Severity of Disease in 1847 Males. *Circulation* 62(3): 477-484, September 1980.

Using recently developed statistical techniques, the joint probability density functions for plasma cholesterol and plasma triglyceride concentrations in 12 subgroups of 1,847 males with angiographically demonstrated coronary artery disease were estimated. The subjects were grouped by patterns of age, history of hypertension, history of smoking, and severity of disease. From the estimated joint probability density functions, the way in which the risk of severe vs. moderate coronary artery disease varied with the joint variation of plasma lipids for given combinations of the other risk factors was determined. The patterns of risk that were found provide evidence for the complicated way in which the relationship between plasma lipids and the severity of coronary artery disease is affected by other risk factors. (Auth. Abs.)

**81-0506.** Simmonds, J. P.; O'Malley, B. P.; Maskill, M. R.; O'Connor, J. F.; BurrIDGE, D. J. Beta-Thromboglobulin Levels in Relation to Myocardial Infarction—Preliminary Observations. *Acta Haematologica* 64(3): 172-175, 1980.

Patients with myocardial infarction (n=34, with equal numbers of smokers and nonsmokers) were studied with daily measurements of  $\beta$ -thromboglobulin (BTG) and  $^{125}$ I fibrinogen scanning in order to detect deep-venous thrombosis (DVT). Serial levels of BTG were unhelpful in the early detection of this condition, which occurred in seven of the patients studied. Of the seven patients with DVT, five had received prophylactic heparin and six of them were nonsmokers. This latter observation is in support of previous studies suggesting an increased incidence of DVT after myocardial infarction in nonsmokers as compared to smokers. (Auth. Abs. Mod.)

**81-0507.** Solberg, L. A.; Enger, S. C.; Hjermann, I.; Helgeland, A.; Holme, I.; Leren, P.; Strong, J. P. Risk Factors

for Coronary and Cerebral Atherosclerosis in the Oslo Study. In: Gotto, A. M., Jr.; Smith, L. C.; Allen, B. (Editors). *Atherosclerosis V*. New York, Springer-Verlag, 1980, pp. 57-62.

Coronary and cerebral arteries from 150 men in the Oslo Study were collected at autopsy and graded for the extent of intimal raised atherosclerotic lesions. The grading results were correlated with risk factors recorded before death. Raised atherosclerotic lesions were significantly correlated to total serum cholesterol, systolic and diastolic blood pressure. HDL-cholesterol was negatively correlated with coronary raised lesions. No significant correlations were found between atherosclerosis and nonfasting serum triglycerides, cigarette smoking, or physical activity at work and at leisure. (Auth. Abs.)

**81-0508.** Sternby, N. H. Atherosclerosis, Smoking and Other Risk Factors. In: Gotto, A. M., Jr.; Smith, L. C.; Allen, B. (Editors). *Atherosclerosis V*. New York, Springer-Verlag, 1980, pp. 67-70.

In this study, 703 55-year-old men (436 smokers, 108 nonsmokers, 159 ex-smokers) were followed for 9 years after a health examination to evaluate the role of smoking in relation to cause of death and development of atherosclerosis. Smokers had a 3-4 times higher mortality than nonsmokers and showed more extensive atherosclerosis in the aorta, pelvic, leg, and cerebral arteries, but not in the coronary arteries. Coronary stenosis was, however, more frequent among smokers. Heavy smokers (>14 cigarettes/day) had, generally speaking, more extensive atherosclerosis and a higher frequency of artery stenosis than light smokers (1-14 cigarettes/day). Of other risk factors hypertension increased atherosclerosis in all arterial segments whereas hyperlipoproteinemia and low physical activity had little influence, if any. (Auth. Abs. Mod.)

**81-0509.** Strong, J. P. Atherosclerosis, a Preventable Disease? Autopsy Evidence. In: Hauss, W. H.; Wissler, R. W.; Lehmann, R. (Editors). *International Symposium: State of Prevention and Therapy in Human Arteriosclerosis and in Animal Models*. Opladen, Westdeutscher Verlag, 1978, pp. 89-100.

Three lines of evidence from human autopsy studies, including the International Atherosclerosis Project (IAP) and the New Orleans smoking and atherosclerosis study, suggest that atherosclerosis might be preventable. The first is the association between certain risk factors (e.g., elevated serum cholesterol levels, elevated blood pressure, and cigarette smoking) and extent of atherosclerotic lesions in the coronary arteries and/or aorta as observed in the New Orleans study. The second line of evidence is the wide variability in the extent and the severity of atherosclerosis among individuals of homogeneous human populations as seen in the IAP study. The third line of evidence obtained by examining mean extent

of atherosclerosis in human autopsy populations involves population differences rather than individual differences as seen in the IAP study. These data offer evidence that the disease might be prevented by modification of environmental factors. (Auth. Abs. Mod.)

**81-0510.** Toivonen, H. **Blood Pressure Responses of Rats to Angiotensin I and II After Exposure to Cigarette Smoke.** *Research Communications in Chemical Pathology and Pharmacology* 29(2): 243-249, August 1980.

One day after a single cigarette smoke exposure, rat blood pressure responses to intravenous injections of angiotensin I and II were slightly increased in comparison to sham-exposed animals. When the exposure was repeated daily during 10 consecutive days, no changes could be detected. These results suggest that the total conversion of angiotensin I in vivo was not affected by cigarette smoke, but the sensitivity of rats to angiotensin II was slightly increased after a single exposure to cigarette smoke. (Auth. Abs.)

**81-0511.** Velican, D.; Velican, C. **Atherosclerotic Involvement of the Coronary Arteries of Adolescents and Young Adults.** *Atherosclerosis* 36(4): 449-460, August 1980.

An investigation of the coronary arteries by light microscopy of 107 unselected subjects between 16 and 25 years of age revealed coronary atherosclerotic plaques in 12 percent of 52 adolescents and in 28 percent of 55 young adults. All the plaques of adolescents and one-third of the plaques of young adults escaped recognition on ordinary gross inspection, even after Sudan staining. A centrifugal extension of plaques from the branching areas to the proximal segment of the main coronary arteries took place, starting from adolescence. During early adulthood this centrifugal extension continued involving the intermediate segments of the anterior descending and right coronary arteries. In undistended vessels, the coronary atherosclerotic plaques narrowed the luminal diameter up to 55 percent in adolescents and up to 65 percent in young adults. Histologically, the mucoid type of plaque, rich in areas of edema, insudate and depolymerized ground substance, prevailed in the coronary arteries of adolescents; in young adults, the prevalent plaque was the lipid-rich variety, containing many clusters of lipid-filled and foam cells. In addition, necrotic plaques or atheromas have been revealed for the first time in young adults. A positive association appeared in our material between cigarette smoking and the presence of mucoid plaques in the proximal segment of the main coronary arteries of adolescents. On the other hand, no relation could be established between risk factors and the accumulation of lipid-filled and foam cells in the atherosclerotic plaques of young adults. (Auth. Abs.)

**81-0512.** Wyndham, C. H.; Wiles, F. J.; Gray, A.; Mendelsohn, D.; Seftel, H. C. **The Prevalence of Ischaemic Heart Disease Risk Factors in Middle-Aged White Miners.** *South African Medical Journal* 58(12): 471-476, September 20, 1980.

The prevalence of ischemic heart disease (IHD) risk factors was studied in a random sample of 3,930 white miners in South Africa, aged 45-62 years, of whom 202 had evidence of a definite or probable myocardial infarct (MI) on electrocardiographic and chest pain criteria. Excluded from the study were 92 classified as "suspect" MI cases. The prevalence of the major IHD risk factors (mildly elevated total serum cholesterol levels and blood pressure, and cigarette smoking) in the 3,636 white miners who had not had MIs did not differ from those in comparable populations in Great Britain, the United States, and Australia, nor did those of secondary IHD risk factors (elevated blood glucose and plasma uric acid levels, and being overweight) differ in the various populations. Among the MI cases, 53.4 percent were current smokers and 52.7 percent of the controls were smokers. Heavy smoking (>15 cigarettes/day) was present in 21.3 percent of the MI cases and in 27.2 percent of the controls. There was, however, a relatively high percentage of middle-aged white miners with two (25.2 percent) and three (4.4 percent) simultaneous IHD risk factors. Such men have a much higher probability of an MI within 8 years than men with no IHD risk factors. This study indicates that 770 out of every 1,000 middle-aged white miners would have one or more major IHD risk factors; of these, 252 would have two risk factors and 44 would have three risk factors. It is stated that this finding points to the urgent need for an intervention program for the early detection and prevention of IHD risk factors. (Auth. Abs. Mod.)

**81-0513.** Zinkham, W. H.; Houtchens, R. A.; Caughey, W. S. **Carboxyhemoglobin Levels in an Unstable Hemoglobin Disorder (Hb Zurich): Effect on Phenotypic Expression.** *Science* 209(4454): 406-408, July 18, 1980.

The affinity of hemoglobin Zurich (HbZ) for carbon monoxide (CO) is approximately 65 times that of normal hemoglobin. The carboxyhemoglobin content in serum from 15 individuals with HbZ ranged from 3.9 to 6.7 percent in 9 nonsmokers and from 9.8 to 19.7 percent in 6 smokers. Rates of hemolysis and hemoglobin denaturation were less in smokers than in nonsmokers. In four nonsmokers with carboxyhemoglobin percentages of 5.5, 5.4, 5.4, and 5.4, the amount of hemoglobin precipitated by isopropanol was 20.8, 21.6, 19.4, and 22.5 percent, respectively. In three smokers with carboxyhemoglobin percentages of 14.8, 19.7, and 19.0, hemoglobin precipitate was 12.3, 12.0, and 10.7 percent, respectively. These effects may be secondary to the stabilization of HbZ by CO. (Auth. Abs. Mod.)

See also, 81-0399, 81-0609

## PREGNANCY AND INFANT HEALTH

**81-0514.** Ardito, G.; Lamberti, L.; Ansaldi, E.; Ponzetto, P. Sister-Chromatid Exchanges In Cigarette-Smoking Human Females and Their Newborns. *Mutation Research* 78(2): 209-212, 1980.

An analysis was made of the effects of smoking habits on sister chromatid exchange (SCE) frequency in pregnant women and their newborns. SCE frequency in lymphocytes from 10 smokers, 10 nonsmokers, and their newborns was analyzed. The smokers maintained a rate of  $\geq 5$  cigarettes/day at the end of pregnancy as compared to the 10-20 cigarettes/day rate at the beginning of pregnancy. The results for the 40 subjects show no significant difference in the mean SCE frequency between smokers and nonsmokers ( $8.13 \pm 3.58$  and  $8.14 \pm 3.39$  SCE/cell). However, significant differences were found between mother and newborn pairs. Among the 10 smoker pairs, 6 mean SCE frequency values were highly significant ( $p < 0.01$ ), 3 were significant ( $p < 0.05$ ), and 1 was not significant. Among the 10 nonsmoker pairs, 8 mean SCE frequency values were highly significant ( $p < 0.01$ ), 1 was significant ( $p < 0.05$ ), and 1 was not significant. It is concluded that there is no significant difference in SCE rates for smokers (5-10 cigarettes/day) and nonsmokers; however, there is a significant difference in SCE rates between mother/newborn pairs.

**81-0515.** Berkowitz, G. S. An Epidemiologic Study of Preterm Delivery. *American Journal of Epidemiology* 113(1): 81-92, January 1981.

A case-control study of the epidemiology of preterm delivery was undertaken in Connecticut during 1977. The study population consisted of 175 mothers of singleton preterm infants and 313 mothers of singleton term infants. Significant risk factors of a preterm delivery included low socioeconomic status, low pregravid weight, inadequate weight gain during pregnancy, a previous preterm delivery, a history of infertility problems, an induced abortion terminating the previous pregnancy, vaginal spotting or light bleeding during pregnancy, antepartum hemorrhage and abnormal placental implantation, lack of leisure-time physical activities during pregnancy, alcohol consumption prior to the third trimester of pregnancy, and negative attitudinal expression toward the pregnancy. The initial findings of a statistically significant increase of cigarette smokers among cases (49.9 as compared to 36.2 percent in the controls) and nonsignificant differences in alcohol consumption between cases and controls were essentially reserved when account was taken of possible confounding variables. The disappearance of cigarette smoking altogether in the final multivariate model appeared to be related in part to the effects of such variables as race, marital status, socioeconomic status, alcohol consumption, and maternal weight gain. (Auth. Abs. Mod.)

**81-0516.** Fabia, J.; Drolette, M. Twin Pairs, Smoking in Pregnancy and Perinatal Mortality. *American Journal of Epidemiology* 112(3): 404-408, September 1980.

Twins born in the province of Quebec during the first 6 months of 1972 were identified by reviewing all live births and perinatal death certificates. A total of 852 twins, constituting 426 pairs, were included in the study. Smoking habits of the mother during pregnancy were recorded at the hospital of birth for 88.5 percent of the pairs. The risk of at least one perinatal death was significantly higher for twin pairs born to smoking mothers. The Mantel-Haenszel test statistic controlling for sex of pairs, parity (0, 1+), maternal age ( $< 25$ ,  $\geq 25$  years) and years of schooling was 4.224 ( $p = 0.04$ ). The standardized risk ratio for smoking versus nonsmoking mothers that a pair will have at least one death was 1.77. As expected, the relative risk of perinatal death associated with smoking appears to be higher for twins than for singletons.

**81-0517.** Fogelman, K. Smoking in Pregnancy and Subsequent Development of the Child. *Child: Care, Health and Development* 6(4): 233-251, 1980.

Data from the National Child Development Study have been used to examine the relationship between mother's smoking during pregnancy and neonatal mortality, birthweight, and the subsequent development of the child to the age of 11. In this paper, analyses are reported which extend this work to examine development by the age of 16. After allowing for a wide range of related background factors, it is found that mothers' smoking during pregnancy continues to be related ( $p < 0.001$ ) to the child's reading and mathematics attainment. For boys, but not girls, there is an association with height ( $p < 0.05$ ). An inconsistent relationship is found with the child's history of asthma and wheezy bronchitis. Some doubts about the direct causality of such relationships are discussed. (Auth. Abs. Mod.)

**81-0518.** Fortney, J. A.; Janowitz, B. S.; Goldsmith, A. Adolescent Mothers and Birth Weight in Latin America. In: Sakamoto, S.; Tojo, S.; Nakayama, T. (Editors). *Gynecology and Obstetrics*. Proceedings of the IX World Congress of Gynecology and Obstetrics, Tokyo, October 25-31, 1979, Amsterdam, Excerpta Medica, 1980, pp. 54-62.

Data on obstetric deliveries from hospitals in urban areas of five Latin American countries (i.e., Honduras, El Salvador, Colombia, Venezuela, Chile) were used to assess the effect of youth on the outcome of delivery. Other factors known to affect the outcome of pregnancy (previous reproductive history, marital status, education, antenatal care, and smoking) were studied. The effect of one of the factors, smoking, on birthweight was significant ( $p < 0.05$ ) in Honduras and

Chile. However, when the effects of these factors were controlled, there still remained an age effect—women under 18 had smaller babies than women aged 18-24. Although this difference was statistically significant in four of the five countries, it was probably not clinically significant (75 g at the most). (Auth. Abs. Mod.)

**81-0519.** Garn, S. M.; Petzold, A. S.; Ridella, S. A.; Johnston, M. **Effect of Smoking During Pregnancy on Apgar and Bayley Scores.** (Letter). *Lancet* 2(8200): 912-913, October 25, 1980.

The effect of maternal smoking on Apgar and Bayley test scores for newborns and infants of 22,159 black and 21,329 white women is investigated. Of women who smoked  $\geq$  two packs/day, the frequency of low Bayley scores in their children increased by half for both motor and mental items. For instance, Bayley motor scores ( $<26$ ) for infants of blacks vs. whites were 9.7 and 10.1 respectively for nonsmokers, and 11.8 and 15.8 respectively for 41-60 cigarettes/day smokers. Apgar scores  $\leq 2$  increased markedly in percentage with increasing maternal smoking. Percentages of Apgar 5 min scores ( $<2$ ) in infants of black mothers increased from 1.2 in nonsmokers and 1-20 cigarettes/day smokers, to 2.9 in 21-40 cigarettes/day smokers, and to 8.3 in 41-60 cigarettes/day smokers. Corresponding percentages in infants of white mothers were 0.8, 1.0, 1.2, and 3.3. After excluding infants of  $<38$  weeks gestation, to eliminate the effects of prematurity on Bayley scores, the analyses were repeated. In 18,532 white and 15,858 black term infants there were the following percentages of low test scores in infants whose mothers smoked 0 as compared with 41-60 cigarettes/day: Bayley motor ( $\leq 26$ ) white 8.5 vs. 11.5; Bayley motor ( $<26$ ) black 7.0 vs. 11.1; Apgar 1 min ( $\leq 2$ ) white 2.8 vs. 6.7; and Apgar 1 min ( $\leq 2$ ) black 2.9 vs. 3.0. It is suggested that standards for the progeny of nonsmoking mothers be revised upward, and further that Apgar scores  $\leq 5$  reflect maternal smoking more aptly than the conventional cutoff score of 7.

**81-0520.** Gormican, A.; Valentine, J.; Satter, E. **Relationships of Maternal Weight Gain, Prepregnancy Weight, and Infant Birthweight.** *Journal of the American Dietetic Association* 77(6): 662-667, December 1980.

The relationships between prepregnancy weight, maternal weight gain, maternal smoking, and infant birthweight were studied from the obstetric records of 602 patients from 1962 to 1975. Two philosophies regarding optimal weight gain were compared. Before 1971, limited weight gain, particularly for overweight women, was recommended. For pregnancies after 1972, larger weight gains (approximately 24 lbs) were recommended. Data were limited to full-term pregnancies in patients aged 17-35 years. There were 301 patients in each weight gain philosophy group. Smoking habits were recorded for pregnant patients seen after 1973; the information was heretofore not regularly available. The difference in mean infant birthweight within a group of maternal smokers ( $n=62$ ) and nonsmokers ( $n=239$ ) was significant ( $p<0.01$ ).

The mean prepregnancy weight, mean weight gain in the last two trimesters, and mean infant birthweight for the smokers vs. nonsmokers were respectively, 135.3 and 133.8 lbs, 22.6 and 24.6 lbs, and 3,316 and 3,484 gms. The study results add support to advocacy of larger weight gains (20-27 lbs) during pregnancy. Further, it is stated that encouragement of higher weight gains in smokers may help affect smoking-related low birthweights.

**81-0521.** Haworth, J. C.; Ellestad-Sayed, J. J.; King, J.; Dilling, L. A. **Relation of Maternal Cigarette Smoking, Obesity, and Energy Consumption to Infant Size.** *American Journal of Obstetrics and Gynecology* 138(8): 1185-1189, December 15, 1980.

The dietary energy intakes of 153 public patients (94 smokers and 59 nonsmokers) and 383 private patients (208 smokers and 175 nonsmokers) were assessed in the last month of pregnancy. Birthweight and crown-heel length of offspring were related to maternal size (weight for height) and smoking habits. Birthweight and length increased significantly with increasing maternal weight for height in the private group but not in the public group. In both groups, and in all weight categories, infants of smokers were lighter and shorter than those of nonsmokers. Neither the fetal growth retardation in the smokers nor the fetal growth enhancement in the overweight mothers was explainable on the basis of maternal dietary energy intake. Maternal obesity and cigarette smoking act independently of each other and maternal overweight does not protect the fetus against the growth-retarding effect of smoking. (Auth. Abs.)

**81-0522.** Naeye, R. L. **Influence of Maternal Cigarette Smoking During Pregnancy on Fetal and Childhood Growth.** *Obstetrics and Gynecology* 57(1): 18-21, January 1981.

Data from 8,193 pregnancies were analyzed for clues to the mechanisms responsible for the fetal growth retardation associated with maternal cigarette smoking. The retardation proved independent of mothers' prepregnancy body weights and pregnancy weight gains; therefore, it was not due to undernutrition. As the retardation was present in intrapair comparisons of siblings at birth and 7 years, whose mothers had smoked in only one of their pregnancies, it was not due to genetic factors. Cigarette smoking causes permanent damage to uterine arteries; however, this did not retard fetal growth because retardation was absent when mothers stopped smoking during pregnancy. The growth of neonates was retarded when mothers smoked throughout pregnancy for all net weight gain during pregnancy categories. Birthweight, length, and head circumference were all significantly ( $p<0.001$ ) affected by maternal smoking. Results of the study exclude undernutrition, genetic factors, and placental underperfusion as major contributing factors to the fetal growth retardation associated with cigarette smoking. (Auth. Abs. Mod.)

**81-0523.** Peters, D.A.V.; Taub, H.; Tang, S. *Postnatal Effects of Maternal Nicotine Exposure. Neurobehavioral Toxicology* 1(3): 221-225, 1979.

Rats were given dilute nicotine solutions as their only source of drinking water while control rats received distilled water. Two months after the start of treatment, the rats were mated. Litters born to nicotine-treated rats were at birth either left with the dams until weaning (nicotine group) or cross-fostered to control dams (cross-fostered nicotine group). Both parents and offspring were tested when the pups were 60-80 days of age. The drug-treated adult rats showed a marked reduction

in body weight gain during the period of drug treatment. The dams were more active during the day and exhibited a reduced plasma corticosterone response to stress. Male but not female offspring of nicotine-treated rats were significantly ( $p < 0.05$ ) lighter at birth than control males. Offspring in the nicotine group showed an increased spontaneous motor activity in the light which was not prevented by cross-fostering to control dams at birth. The results support the hypothesis that prenatal exposure to nicotine causes significant changes in behavior in later life. (Auth. Abs.)

See also, 81-0376, 81-0389, 81-0581

## OTHER DISEASES AND CONDITIONS

**81-0524.** Baumann, R. J.; Jameson, H. D.; McKean, H. E.; Haack, D. G.; Weisberg, L. M. *Cigarette Smoking and Parkinson Disease: I. A Comparison of Cases With Matched Neighbors. Neurology* 30(8): 839-843, August 1980.

Home interviews with 237 Parkinson patients and 474 age-, sex-, and race-matched neighbors were conducted to determine the effect of smoking habit on the incidence of Parkinsonism. When patients and neighbors were compared for ever regularly smoking cigarettes, cigar, or pipe; using snuff; chewing tobacco; or drinking coffee, tea, or alcoholic beverages, the only significant difference was in ever smoking cigarettes regularly. One hundred fifty Parkinson patients (63 percent) and 224 neighbors (47 percent) had never smoked cigarettes regularly. Analysis of smoking status at each time examined gave similar results. Analysis by sex of patients ever smoking cigarettes regularly showed a highly significant difference ( $p < 0.0001$ ) between women patients and their female neighbors, whereas a difference in the same direction between the men reached only borderline significance. A similar pattern was seen when smoking status at each time was examined. Interviews with significant other persons did not uncover an excess of smokers among 48 deceased Parkinson patients. Also, among patients who had the disease the longest, there was no deficit of cigarette smokers. These results suggest that Parkinson patients who smoke do not succumb to illnesses associated with smoking more often or quickly than other smokers, so selective mortality cannot account for the inverse relationship between Parkinsonism and smoking.

**81-0525.** Christen, A. G.; McDaniel, R. K.; Doran, J. E. *Snuff Dipping and Tobacco Chewing in a Group of Texas College Athletes. Texas Dental Journal* 97(2): 6-10, February 1979.

A total of 14 college varsity male athletes (7 baseball and 7 football players), ages 18-22, from a small college in Texas were examined and interviewed concerning their use of snuff and chewing tobacco. Color photographs of affected mucosa and gingiva were made. Seven of the athletes used snuff only, six used snuff and chewing tobacco, and one used chewing tobacco only. The frequency of use ranged from two to eight dips of tobacco/day. Of the group, 9 members had obvious signs of clinically detectable intraoral leukoplakia, 8 had gingival recession in 1 to 4 teeth in the area immediately adjacent to where the tobacco quid was held, and 11 had erythematous soft-tissue changes. Snuff dipping and tobacco chewing among college athletes and students in Texas are apparently much more common than generally recognized. (Auth. Abs.)

**81-0526.** Daftary, D. K.; Bhonsle, R. B.; Murti, R. B.; Pindborg, J. J.; Mehta, F. S. *An Oral Lichen Planus-Like Lesion in Indian Betel-Tobacco Chewers. Scandinavian Journal of Dental Research* 88(3): 244-249, 1980.

During an epidemiologic study of oral cancer and precancerous lesions among Indian villagers ( $n = 5,099$ ), a lichen planus-like lesion was observed in Kerala. Of the total study population, 1,098 (21.6 percent) smoked, 1,206 (23.6 percent) chewed, and 500 (9.8 percent) smoked and chewed. The lesion consisted of white, wavy, parallel, nonelevated lines that could not be scraped off. The lesion occurred exclusively among betel-tobacco chewers and at the site of placement of quid. The lesion was found in 2.6 percent of the betel-tobacco chewers and in 0.8 percent of those who smoked and chewed. There were no subjective symptoms. The peak prevalence of the 35 diagnosed lesions was in the 35-44 year age group for males (1.2 percent) and 45-54 for females (2.5 percent). There was a marked female predominance with 0.9 percent of the lesions found among females and 0.3 percent found among

males. The histologic features were very similar to those seen in oral lichen planus. (Auth. Abs. Mod.)

**81-0527.** Geist, E. T.; Evans, G. H.; James, R. B. Clinical Study on the Correlation of Tobacco and Ethyl Alcohol Consumption to Lesions of the Head and Neck. *Journal of the Louisiana Dental Association* 37(3): 9-11, 13, Fall 1979.

A clinical study was made on the correlation of tobacco and alcohol consumption to head and neck lesions in 401 oral and maxillofacial surgery patients. Patients were classified as to sex, age, race, and tobacco and alcohol use. Tobacco use was categorized as (1) light use (<1 pack of cigarettes/day or <3 cigars/day), (2) moderate use (1-2 packs/day or 3-6 cigars/day), and (3) heavy use (>2 packs/day or >6 cigars/day). Alcohol use was divided into four categories: occasional, light, moderate, and heavy use. Of the total patients screened 19.7, 17.4, and 4.9 percent were light, moderate, and heavy tobacco users, respectively. A total of 18 patients exhibited head, neck, or oral lesions warranting biopsy, and 1 (moderate smoker) was found to have squamous cell carcinoma of the soft palate. It was concluded that a patient group with a large number of tobacco and alcohol users may show increased incidence of oral lesions and malignancy.

**81-0528.** Haahtela, T.; Heiskala, M.; Suoniemi, I. Allergic Disorders and Immediate Skin Test Reactivity in Finnish Adolescents. *Allergy* 35(5): 433-441, July 1980.

The prevalence of allergic disorders was studied in an unselected group of 708 adolescents aged 15-17 years. Of the boys, 22 percent were smokers; of the girls, 15 percent were smokers. The prevalence of past or present asthma was 5.7 percent in boys and 3.1 percent in girls. The figures for hay fever were 14 percent and 8 percent, and for atopic dermatitis (including allergic urticaria) 25 percent and 30 percent, respectively. In 24 percent of all symptomatic subjects, the condition had not been active during the year preceding the study. The sex difference in the prevalence of hay fever was significant. It is associated with higher immediate skin test reactivity in boys. A progressive increase in the frequency of allergic disorders was observed with increasing number of positive skin reactions in both boys and girls. Respiratory allergy was closely related to a positive skin test: 87 percent of the asthmatics and 83 percent of all those with allergic rhinitis exhibited at least one positive skin reaction. For atopic dermatitis the association was less pronounced. Of the population studied, 19 percent had a positive symptom history and a positive skin test to pollens, animal epithelia, or dusts indicating a clinically significant relationship. The susceptibility to respiratory infections and prolonged coughs was found to increase with smoking ( $p < 0.004$ ), symptoms of allergy ( $p < 0.00005$ ), and positive skin tests ( $p < 0.02$ ). However, 39 percent of the 346 subjects with a positive skin test, including some with a large number of positive reactions, were completely asymptomatic. (Auth. Abs. Mod.)

**81-0529.** Kamienieski, R. W. Topically Applied Tobacco Juice: Its Affect Upon the Healing of a Nonpenetrating Wound in the Adult Male Rat. Doctoral Dissertation, Brigham Young University, University Microfilms International 80-00073, August 1979, 57 pp.

The nature of this study was to determine the effect of topically applied tobacco juice on the healing rate of traumatized muscle tissue in the adult male rat. Specifically, through a macroscopic and microscopic examination of healing cells, a group of 80 rats was assigned to a treatment group or a control group. The rats were then assigned to one of eight sacrifice periods, each 1 week apart. The treatment rats were painted with tobacco juice b.i.d. the first 14 days of the experiment. The control group was painted with distilled water b.i.d. for the same time period. The following conclusions were made: (1) Those experimental animals that had wounds painted with tobacco juice showed a greater number of healing cells ( $p = 0.01$ ). (2) The wounds on the treatment animals were significantly ( $p = 0.01$ ) smaller at sacrifice time. (3) There was no significant difference in weight gain between treatment and control animals. (Auth. Abs.)

**81-0530.** Klaiber, E. L.; Broverman, D. M.; Vogel, W. Increased Incidence of Testicular Varicoceles in Cigarette Smokers. *Fertility and Sterility* 34(1): 64-65, July 1980.

A total of 474 healthy male smokers and nonsmokers were studied in two samples with a 6-month interval between samples for testicular varicoceles. The first sample contained 30 smokers and 39 nonsmokers with a mean age of 20.6 years with a smoking range of 10 to 40 cigarettes/day for the smokers. The second sample contained 202 smokers and 203 nonsmokers with a mean age of 19.7 years with a similar smoking range as the first sample. In sample 1, the incidence of testicular varicoceles in smokers was significantly higher than in nonsmokers (11 and 4 respectively,  $p < 0.02$ ). In sample 2 the same difference was also significant (41 and 19 respectively,  $p < 0.01$ ). Whether greater testicular varicoceles incidence in smokers is a result of smoking and the possible mechanism if it is, is unknown and cannot be established from these data. However, the incidence of testicular varicoceles is significantly greater in smokers than in nonsmokers and may partially explain the semen abnormalities found in cigarette smokers.

**81-0531.** Mueller, P. B.; Wilcox, J. C. Effects of Marijuana Smoking on Vocal Pitch and Quality. *Ear, Nose, and Throat Journal* 59(12): 506-509, December 1980.

Sustained vowel phonations of nonsmokers (10 women, 1 man, mean age 26 years), cigarette smokers (9 women, 1 man, mean age 22.5 years), and marihuana smokers (7 women, 7 men, mean age 21 years), were subjected to critical review, including fundamental frequency analysis. In addition, each subject underwent indirect laryngoscopy for examination of the vocal cords. The voices of marihuana smokers did not

differ appreciably from those of nonsmokers and of cigarette smokers insofar as perceptual ratings and fundamental frequency measures were concerned. However, eight of the marihuana smokers did exhibit altered appearance of the vocal cords. Not enough is known concerning the potentially harmful effects of marihuana on the vocal mechanism, and further research is indicated. (Auth Abs. Mod.)

**81-0532.** Pristautz, H.; Biffl, H.; Leitner, W.; Parsche, P.; Katschnig, H. Sozialprofil und Begleiterkrankungen der akuten und chronischen Pankreatitis. [Social Profile and Associated Diseases in Acute and Chronic Pancreatitis.] *Acta Medica Austriaca* 7(1): 28-31, 1980, German.

Etiologic and socioeconomic factors of pancreatitis were studied retrospectively in 200 patients, 102 men and 98 women, with acute (119), acute recurring (38), and chronic (43) pancreatitis. The results were compared with those in 250 controls of about the same average age (52.2 vs. 50.5 years) but without pancreatitis. The most significant etiologic factors were found to be biliary diseases after cholecystectomy and chronic alcoholism. Hypercholesterinemia, gastritis, and mumps were also significant factors, either simultaneous with or preceding pancreatitis. Cigarette smoking (>15 cigarettes/day) was found in 46 pancreatitis patients compared to 40 controls, a nonsignificant difference.

**81-0533.** Rycroft, R.J.G. Tobacco Dermatitis. *British Journal of Dermatology* 103(2): 225-229, August 1980.

This is a review article of various studies of tobacco dermatitis epidemiology. The studies reviewed cover a broad range of occupations within the tobacco industry, from cigar and cigarette factory workers to fermentation plant workers. Numerous reports of dermatitis resulting in erythemas, urticarias, and eczemas among tobacco workers and users are cited.

**81-0534.** Shannon, I. L.; Hyde, R. J. Effects of Smoking and Light Deprivation on Human Parotid Flow Rates. *IRCS Medical Science: Clinical Pharmacology and Therapeutics* 8(5/6): 385, May-June 1980.

A study was made of 20 healthy, young adult males, each of whom had been a regular smoker for at least a year, to evaluate the result of light deprivation on smoking-induced parotid flow. Saliva samples were collected under normal smoking conditions and also while the subjects were smoking blindfolded to insure light deprivation. Under normal smoking conditions the mean parotid flow was 0.063 ml/min; however, blindfolding reduced the flow by 16 percent to 0.053 ml/min.

**81-0535.** Stekhun, F. I. Vliyaniye Tabakokureniya na Nekotoryye Pokazateli Spermatogeneza. [Effect of Tobacco Smoking

on Spermatogenesis Indices.] *Vrachebnoe Delo* 7: 93-94, July 1980, Russian.

The number of spermatozoa in 1 ml of ejaculate and their active motility were determined in 247 male smokers, ex-smokers, and nonsmokers (controls) aged 18-50 years, who did not drink alcoholic beverages and had no history of disease that might affect spermatogenesis. Oligospermia was detected in 58.6 percent of the smokers, 41.6 percent of the ex-smokers, and 18.2 percent of the nonsmokers. The number of spermatozoa and their active motility decreased in relation to controls by 42.7 and 21.9 percent, respectively, in men who had smoked since the age of 10-17 years and 39.7 and 17 percent in men who did not start smoking until age 18. The same indices decreased by 40.3 and 17 percent, respectively, in smokers of 10-30 cigarettes/day and 46.2 and 21.4 percent in smokers of 31-50 cigarettes/day. A history of epidemic parotitis in smokers aggravated their oligospermia even more. Giving up smoking for periods of 1-5 years resulted in a 50 percent increase in the number of spermatozoa and a 47 percent increase in their motility compared to smokers.

**81-0536.** Sutherland, W.H.F.; Temple, W. A.; Nye, E. R.; Herbison, G. P. Adiposity, Lipids, Alcohol Consumption, Smoking, and Gender. *American Journal of Clinical Nutrition* 33(12): 2581-2587, December 1980.

Indices of obesity, plasma lipids, and lipoprotein levels; plasma cholesteryl ester fatty acid composition; reported alcohol consumption; and smoking habits were measured in 88 men (of whom 31 were smokers) and 87 women (of whom 29 were smokers), ages over 15 years, randomly selected from the total respondents (1,192) to a health survey. Most indices of obesity were related to plasma triglycerides and high-density lipoprotein levels in both sexes; to very low-density lipoprotein levels in men only; and to plasma cholesteryl ester fatty acid linoleic acid proportions in women only. The correlations with high-density lipoprotein cholesterol levels were dependent on very low-density lipoprotein triglyceride levels in men but not in women. Indices of obesity were significantly higher in nonsmoking women than in those who smoked (Quetelet's index (body mass index)  $p < 0.025$ , skinfold thickness  $p < 0.05$ ). In nonsmoking men, the indices were also higher than in men who smoked, but not significantly. Reported alcohol consumption correlated with Quetelet's index in men. Smoking habits, but not alcohol consumption, influenced correlations between indices of obesity and plasma triglycerides and very low-density lipoprotein triglyceride levels in men. The present results showed several sex-related differences in relationships with indices of obesity. Lower very low-density lipoprotein levels, higher skinfold measurements, higher cholesteryl ester fatty acid linoleic acid proportions, and lower alcohol intake in women than in men may be responsible. The data suggested that in women, altered diet composition may be linked with obesity. (Auth. Abs. Mod.)

**81-0537.** Thomas, J.; Greig, M.; McIntosh, J.; Hunt, J.; McNeil, D.; Piper, D. W. *The Location of Chronic Gastric Ulcer. A Study of the Relevance of Ulcer Size, Age, Sex, Alcohol, Analgesic Intake and Smoking.* *Digestion* 20(2): 79-84, 1980.

Analgesic intake, alcohol and cigarette consumption, age, sex, and ulcer size were studied in relation to the site of the ulcer in 215 patients with chronic gastric ulcer (96 initial, 115 recurrent). Ulcer site was classified into upper (U), middle (M), and lower (L) thirds of the stomach, on X-ray films of air-contrast barium studies. The ulcers were situated in the upper third in 37 patients (17 percent), middle third in 90 patients (42 percent), and lower third in 88 patients (41 percent), i.e., significantly more in M and L compared to U ( $p < 0.001$ ). A total of 135 ulcers were on the lesser curve (63 percent) with more in L and M compared to U ( $p < 0.0005$ ). Posterior wall ulcers accounted for 29.3 percent. Ulcers were

smallest in L (mean 28.8 mm<sup>2</sup>) compared to those in M (mean 66.1 mm<sup>2</sup>) and U (mean 64.4 mm<sup>2</sup>) ( $p < 0.001$ ). Mean size overall was 49.0 mm. The mean age of the patients was 58.8 years with no significant differences in age between U, M, and L ( $p > 0.9$ ). The M/F ratio in the whole series was 0.6 which varied with ulcer site, being 0.3 in U (differing significantly from the whole series,  $p < 0.05$ ), 0.4 in M, and 1.2 in L (significantly different from the whole series,  $p < 0.01$ ) and from U ( $p < 0.01$ ). Initial ulcers did not differ from recurrent ulcers except in women where initial ulcers were more common in M and L, whereas recurrent ulcers were more common in U. The independent variables, namely, alcohol and analgesics (with the exception of smoking), were not determinants of ulcer site, size, or position once the patients were segregated by sex. In men only, there were interactions between L and lesser curve site ( $p < 0.004$ ) and L and smoking ( $p < 0.03$ ). (Auth. Abs. Mod.)

See also, 81-0382, 81-0449, 81-0477, 81-0499

## BEHAVIORAL AND PSYCHOLOGICAL ASPECTS

**81-0538.** Aitken, P. P. *Peer Group Pressures, Parental Controls and Cigarette Smoking Among 10 to 14 Year Olds.* *British Journal of Social and Clinical Psychology* 19(2): 141-146, 1980.

Results obtained from previous studies conducted in Great Britain indicate that secondary school boys who smoke are subjected to more peer group pressures and fewer parental controls with respect to smoking. In the present study, information obtained from 384 children in central Scotland suggests that 10- to 14-year-olds who smoke or have experimented with cigarettes are generally more responsive to peer group pressures and generally less likely to take account of parental wishes and decisions with respect to a wide range of other activities. These findings—which were independent of age, sex, and school catchment area—are discussed with reference to suggestions that children should be used as health educators. It is suggested that adult-oriented children—children who are most likely to support such ventures—are unlikely to discourage peer-oriented children from experimenting with cigarettes. On the other hand, it seems that the success of attempts to use peer-oriented children as health educators depends to a large extent on the success of attempts to discourage adults from smoking. (Auth. Abs.)

This paper uses findings from five nationally representative surveys of high school seniors from 1975 through 1979 to examine the correlates of licit and illicit drug use, and to consider whether recent changes in youthful drug use are linked to any changes in the correlates. Males still exceed females in use of alcohol and marihuana, but no longer in cigarette smoking. Females now exceed males in the percentage who smoke one-half pack or more each day, as well as in the total percentage reporting any cigarette use during the past month. Black seniors now report less drug use than whites. Other dimensions of family background, region, and urbanicity show only modest associations with drug use. Above average drug use occurs among those less successful in adapting to the educational environment, as indicated by truancy and low grades; those who spend many evenings out for recreation; and those with heavy time commitments to a

**81-0539.** Bachman, J. G.; Johnston, L. D.; O'Malley, P. M. *Smoking, Drinking, and Drug Use Among American High School Students: Correlates and Trends, 1975-1979.* *American Journal of Public Health* 71(1): 59-69, January 1981.



Doctoral Dissertation, City University of New York, University Microfilms International 80-23687, June 1980, 148 pp.

The effects of cigarette-withdrawal (or thirst) and a verbally related stimulus on dream reports were investigated in 20 male volunteers, ranging in age from 16 to 40 years, who smoked at least one pack of cigarettes/day. In the first condition, baseline dreams were elicited from subjects. In the second counterbalanced condition, subjects were cigarette-deprived for 24 hrs, and during their laboratory sleep period a cigarette-related message was delivered to subjects during REMPs (i.e., phasic and tonic). In a variation of the second night, the same participants were fluid-deprived for 24 hrs, and then fed a salty meal prior to going to bed; dream report collection and thirst message administration were similar to the cigarette condition. For the control conditions or awakenings, subjects were not deprived of food, water, or cigarettes; mentation report collection was not preceded by a verbally related stimulus. It was found that cigarette content in dreams was not maximized in the cigarette withdrawal condition beyond the level of the control situation; cigarette-related dream content was more frequent in the cigarette-withdrawal-*tonic*-stimulus than the cigarette-withdrawal-*tonic*-no-stimulus condition; class 2 minimum hostility was more frequent in the cigarette-withdrawal than the fluid-deprivation condition, but not for control; neither thirst nor cigarette-withdrawal increased the frequency of oral-derivative dream themes; dream themes seemed to have bearing on intensity of postsleep cigarette need. Subjects with gratifying dreams (i.e., positive themes of eating, drinking, and/or cigarette-withdrawal symptoms) smoked less cigarettes following sleep than nongratified subjects; cigarette-withdrawal and thirst, in the presence of the auditory stimulus, increased the amount of REM phasic activity. There tended to be more words in the thirst-phasic-stimulus than baseline-phasic condition; thirst-phasic-stimulus, than thirst-*tonic*-stimulus, and cigarette-withdrawal-phasic-stimulus, than no-stimulus counterpart situation. Moreover, there were more words from phasic than tonic dreams. (Auth. Abs. Mod.)

**81-0541.** Burgess, A. M., Jr.; Casey, D. V.; Tierney, J. T.; DePalo, P. Cigarette Smoking by Rhode Island Physicians: A Fifteen Year Update. *Rhode Island Medical Journal* 63(9): 345-347, September 1980.

This paper presents results from an update of a 15-year-old survey initially performed in 1963, on the smoking habits of Rhode Island physicians. The update had three main objectives: to determine whether the decline of smoking among physicians had slowed, to investigate why many physicians had never been regular smokers, and to examine whether foreign-trained physicians differed from domestic physicians in their smoking habits. The data indicate that 12.7 percent of the responding physicians ( $n=1,399$ ) in 1978 were current smokers as opposed to 33.0 percent in 1963. Changes in smoking habit within specialties are reported. Two groups (anesthesiologists and otolaryngologists) showed an increased smoking rate, while orthopedists had a decreased rate. The

prominent smoking differences existing between U.S. physicians and those in other countries were not apparent between foreign-trained and domestic graduates. The foreign-trained graduates not currently smoking included more former smokers. Only 6.1 percent of these graduates smoked other forms of tobacco as compared to 11.3 percent of domestically trained graduates. A total of 858 physicians who responded in the 1978 survey, had also responded in a survey in 1973. Of these, 150 smoked in 1973 and 60.7 percent continued to do so, while 39.3 percent had stopped by 1978. Another 320 were former smokers in 1973 and 94.7 percent still did not smoke in 1978, while 5.3 percent had resumed smoking. Also, 388 had never smoked in 1973 and 99.5 percent had still not done so by 1978, while 0.5 percent had started.

**81-0542.** Carll, E. K. Perception of the Personal Attributes of Male and Female Smokers as a Function of the Sex and Smoking Status of the Observer. Doctoral Dissertation, Hofstra University, University Microfilms International 78-6162, 1977, 150 pp.

The effects of the sex and smoking status of the observer upon the perception of the personal attributes of male and female smokers were studied with two levels of smoking status of participant (smokers or nonsmokers), sex of participant (male and female), two levels of smoking behavior of model (smoking or not smoking), sex of model (male and female), and two levels of context (indoor and outdoor environmental situation). All participants rated photographs of models on a 7-point rating scale on 18 pairs of adjectives. Each participant received one of eight versions of the photograph. As predicted, a significant interaction between smoking status of participant and smoking behavior of model indicated that smoking models were perceived more favorably, that is, as being more attractive, sociable, adventurous, popular, sophisticated, and confident by smoker participants than by nonsmoker participants. In addition, smoking models were also perceived as being more aggressive, outgoing, interesting, secure, daring, independent, and intelligent by smoker participants than by nonsmoker participants. Smoker participants also rated smoking models as being more sociable, adventurous, popular, sophisticated, aggressive, outgoing, interesting, secure, daring, and intelligent than they did nonsmoking models. It was also predicted that male smoking models would be perceived more favorably, that is, as being more attractive, sociable, adventurous, and confident than would female smoking models. This hypothesis was not supported as no difference was discerned between male and female smoking models. However, male nonsmoking models were perceived as being more aggressive, daring, and secure than female nonsmoking models. Female smoking models were perceived as being more aggressive, daring, and secure than female nonsmoking models, while no difference was discerned between male smoking and nonsmoking models. The hypothesis that female smoker participants would perceive female smoking models more favorably, that is, as being more attractive, sociable, adventurous, popular, and confident, than would female nonsmoker participants was not support-

ed. Additional significant interactions which were not predicted were also reported and discussed. A significant main effect for participant smoking status indicated that smoker participants perceived models more favorably than did nonsmoker participants. A significant main effect for model smoking behavior indicated that participants perceived smoking models as being more aggressive than nonsmoking models. (Auth. Abs. Mod.)

**81-0543.** Chalmers, D.; Marcus, S.; Aaronson, B.; Engstrom, D. A Comparison of Substance Abuse Profiles Among Problem Drinkers, Problem Smokers, and Overeaters. In: Galanter, M. (Editor). *Recent Advances in Research and Treatment*. Currents in Alcoholism, Volume 7. New York, Grune and Stratton, 1980, pp. 391-400.

Substance abuse profiles were compared among alcoholics ( $n=40$ ), problem smokers ( $n=17$ ), and overeaters ( $n=49$ ). A total of 15 scales were investigated under the rubrics of motivation, style (craving, loss of control, and drug use), and effects (beneficial and harmful). While all three samples were similar on the motivation scales, smokers differed substantially from alcoholics and overeaters on the style scales and in terms of emotional effects. Smokers were more similar to alcoholics on perceived beneficial effects, and alcoholics reported more severe harmful effects. Implications of the results for substance dependency theories and for treatment models were discussed. (Auth. Abs.)

**81-0544.** Christiansen, D. A. *Changing Attitudes About Smoking by Film Communications*. Doctoral Dissertation, University of South Dakota, University Microfilms International 79-11293, December 1978, 46 pp.

Film communications were used in an attempt to modify cigarette smokers' attitudes about smoking. The subjects were 90 females and 90 males (all of whom smoked  $\geq 15$  cigarettes/day) drawn from classes at a vocational college. A positive film, demonstrating the beneficial effects of not smoking, a negative film, vividly portraying the serious consequences of smoking, and a neutral film were used. A pretest—posttest design was used with groups to control for test-retest effects. Because of significant differences in the pretest, analysis of covariance on those subjects in the pretest—posttest groups ( $n=60$ ) was done using the pretest scores as the covariate. In this analysis both positive and negative film groups became more negative toward smoking, but the negative film effect was greater. (Auth. Abs. Mod.)

**81-0545.** Dawley, H. H., Jr.; Morrison, J.; Carrol, S. A Comparison of Hospitalized Veterans' Attitudes Toward Smoking and Smoking Cessation Over a Four Year Period. *Addictive Behaviors* 5(3): 241-245, 1980.

A questionnaire designed to assess the attitudes of patients in a Veterans Administration hospital toward smoking was

administered and the results compared to data from the same questionnaire given 4 years earlier. With few exceptions, the attitudes were resistant to change over that period. Two significant changes were observed. A larger proportion of patients in the later survey (52 percent vs. 39 percent in the earlier survey) reported that their physicians had advised them against smoking,  $p<0.01$ . Also, a larger proportion of smokers reported having quit for a longer period of time in the 1978 survey,  $p<0.05$ . Comparisons were made between smokers' and nonsmokers' background, attitudes, and behavior. More nonsmokers than smokers tended to think that smoking is harmful to their health ( $p>0.10$ ). Over half of the smokers (60 percent) objected to a ban of cigarette sales in the hospital canteen while 20 percent did not object and another 20 percent were not sure. On the other hand, 46 percent of nonsmokers objected to the ban while 36 percent did not and 18 percent were not sure. These proportions did not significantly differ between smokers and nonsmokers. Smokers and nonsmokers did reliably differ on their reports of the hospital staff smoking: 36 percent of the smokers reported that the medical staff had smoked in front of them while 0 percent of the nonsmokers reported such an event,  $p<0.01$ . Despite these differences, over half of the smokers (70 percent) as well as nonsmokers (59 percent) did not object to the staff's smoking in the presence of patients. Responses to the idea of dividing the hospital's cafeteria into smoking and nonsmoking sections were generally favorable: 54 percent of the smokers and 85 percent of the nonsmokers supported this measure. Twenty-eight percent of the smokers were opposed to the measure and 18 percent were not sure, whereas 9 percent of the nonsmokers were opposed to dividing the cafeteria and another 9 percent were not sure. Finally, the veterans were asked their opinion on banning cigarette advertising. Of the smokers, 24 percent were in favor of a national ban, 58 percent were opposed, and 18 percent were not sure. In contrast, 50 percent of the nonsmokers were in favor of the ban, 32 percent were against it, and 18 percent were not sure. The relationship of cigarette consumption and self-reported shortness of breath was discussed. Also, specific recommendations for smoking programs and directions for future smoking research were suggested. (Auth. Abs. Mod.)

**81-0546.** Delaney, J. W. *Perception of Adult Smokers by Schoolchildren*. Doctoral Dissertation, Hofstra University, University Microfilms International 78-14971, 1978, 144 pp.

The effects of models' smoking behavior upon children's attributions were examined in a  $3 \times 2 \times 2 \times 2$  factorial design with three levels of grade (4th, 7th, and 11th), two levels of subject sex, two levels of model behavior (smoking and not smoking), and two levels of model sex. A total of 240 children, 120 male and 120 female, served as subjects in the study. The subjects were given a photograph of a model depicted smoking or the identical photograph with all smoking cues removed. After viewing the stimulus picture subjects rated the model using 18 bipolar adjective rating scales, including young—old, timid—daring, conforming—nonconforming, dependable—not dependable, careful—careless, and healthy—not healthy. There

was a significant ( $p < 0.001$ ) main effect for behavior on age, as expected, that indicated models were rated as older when shown smoking than when shown not smoking. As predicted, smoking models were rated as significantly ( $p < 0.05$ ) less conforming than the identical nonsmoking models. It was also found that the smoking models were rated as significantly more daring ( $p < 0.01$ ), less dependable ( $p < 0.001$ ), less careful ( $p < 0.001$ ), and less healthy ( $p < 0.001$ ). There were no indications that smoking enhanced model ratings on characteristics such as attractiveness, popularity, intelligence, and other positive traits. It was found that smoking behavior of the model was more salient than the sex of the model. Similarly, there were no substantial differences in attributions to the smoking models as a function of the observer's sex or age. It was suggested that children have a negative attitude toward smokers which may be decreased by their own, as well as peer and adult model smoking behavior. Several findings of the present study were found to parallel those of studies comparing personality traits of smokers and nonsmokers. The overall results, which suggest that the smoker is seen in an ambivalent or negative manner, were discussed in reference to the image of a smoker that is projected through the media. (Auth. Abs. Mod.)

**81-0547.** Dantas, N. S. *Smoking Behavior in Greek Schoolchildren.* *World Smoking and Health* 5(2): 34-36, Summer 1980.

The smoking habits of 7,500 Greek schoolchildren between the ages of 15 and 18 were studied by questionnaire. Of the children, 32 percent were regular smokers. Forty-six percent of the boys smoked, compared to 54 percent of the girls. In general, boys smoked a larger number of cigarettes per day than girls. For example, while 31 percent of the boys and 69 percent of the girls smoked between 1 and 5 cigarettes/day, 82 percent of the boys and 18 percent of the girls smoked between 20 and 25 cigarettes/day. Where both parents or only the mother smoked, the percentage of girls smoking was substantially higher than the percentage of boys who smoked (62 vs. 37 percent in both comparisons). There was little difference in the percentages where neither parent or only the father smoked. It is concluded that in Greece major anti-smoking efforts should be directed toward youngsters between the ages of 15 and 16.

**81-0548.** Eiser, J. R. *Smoking and Health: What Can Social Psychology Contribute?* *International Journal of Mental Health* 9(1/2): 164-181, Spring-Summer 1980.

This article reviews and discusses from a social psychological standpoint the smoking habit as an addiction or as a choice, health risk information assimilation, starting smoking, giving up smoking, and failure to give up smoking. Social psychological research is touted as a means for providing some answers for a variety of questions raised by smoking and health considerations.

**81-0549.** Gilbert, D. G.; Hagen, R. L. *The Effects of Nicotine and Extraversion on Self-Report, Skin Conductance, Electromyographic, and Heart Responses to Emotional Stimuli.* *Addictive Behaviors* 5(3): 247-257, 1980.

The hypothesis that nicotine reduces emotional reactions by reducing cortical arousal and the alternative hypothesis that this effect of nicotine occurs because of its tendency to increase perceptual thresholds and/or its tendency to reduce muscular tension were tested by having 48 habitual smokers smoke either high- (1.3 mg) or low- (0.2 mg) nicotine cigarettes just prior to viewing a series of videotaped emotion-producing scenes. Consistent with predictions, the skin conductance response magnitudes of the subjects who smoked the high-nicotine cigarettes were significantly ( $p < 0.001$ ) smaller than were those of subjects who smoked low-nicotine cigarettes. On the other hand, contrary to predictions, there was no significant interaction between extraversion and nicotine for skin conductance or self-report responses. On Day 2, but not Day 1, nicotine reduced self-reports of perceived muscular tension and startle but did not cause a perception of increased heart activity in spite of an actual significant ( $p < 0.001$ ) increase in heart rate. (Auth. Abs.)

**81-0550.** Green, D. E. *Teenage Smoking Behavior.* In: Scarpetti, F. R. (Editor). *Drugs and the Youth Culture.* Sage Annual Reviews of Drug and Alcohol Abuse, Vol. 4, 1980, pp. 147-174.

This chapter focuses on the prevention of smoking in young people, trends in teenage smoking, characteristics, attitudes and perceptions of teenage smokers, and how society in general affects the teenager's smoking behavior. Between 1968 and 1979, interesting trends in the prevalence of teenage smoking can be seen. Overall, there has been a decrease in the proportion of teenage boys and girls who smoke. Particularly in recent years, there has been a decrease in the proportion of boys smoking, observed in every age group. The recent decrease in smoking among girls was not seen in every age group, with no change being observed among the 17- and 18-year-olds. Contrary to tradition, by 1979 a larger proportion of girls (13 percent) than boys (11 percent) were classified as smokers. Further, available data lend no support to the popular fear that teenagers are starting to smoke at earlier ages. Although a large number of adolescents experiment with cigarettes, only about one in three has become a regular smoker by the time he or she is 18 years of age. Those who become regular smokers differ from those who do not in terms of relevant demographic characteristics, lifestyle, and attitudes toward the world around them. Of necessity, the culture in which a teenager grows up plays an important role in his or her willingness to become a smoker. Cigarette smoking among parents, siblings, teachers, health professionals, and other adults often sets a bad example for youth and tends to encourage their smoking behavior. Data indicate, however, that the adolescent today is growing up in a world where smoking is practiced by a minority of adults, and an

even smaller minority of adults he or she is likely to see as exemplars. (Auth. Abs. Mod.)

**81-0551.** Hay, D. R. *The Smoking Habits of Nurses in New Zealand: Results From the 1976 Population Census.* *New Zealand Medical Journal* 92(672): 391-393, November 26, 1980.

In the 1976 New Zealand population census, 25,641 female and 1,682 male nurses responded to a question on cigarette smoking. Of all nurses, 36 percent of the females and 49 percent of the males were cigarette smokers compared with 32 percent of women and 39 percent of men in the general population of  $\geq 15$  years. The highest rate of smoking was among psychiatric nurses of whom half were regular smokers. Two-thirds of psychiatric male and 51 percent of the female nurse smokers smoked  $>20$  cigarettes/day. Those whose nursing duties were among pregnant women, infants, and children smoked less than average, while nurses  $<20$  years of age smoked more than older or registered nurses. In contrast to those in other professional occupations, there are more smokers among nurses than the average for the New Zealand community. (Auth. Abs.)

**81-0552.** Henningfield, J. E.; Griffiths, R. R. *A Preparation for the Experimental Analysis of Human Cigarette Smoking Behavior.* *Behavior Research Methods and Instrumentation* 11(6): 538-544, December 1979.

A preparation for the experimental analysis of cigarette smoking is described in detail. The preparation, which consists of a comfortable naturalistic, experimental environment equipped with a cigarette monitoring system, permits the intensive study of cigarette smoking in individual subjects under controlled laboratory conditions. A variety of behavioral and physiological measures used include rate and pattern of puffing, duration of each puff, time spent smoking cigarettes, expired air carbon monoxide levels, cigarette butt weights, and subjective rating scales of various aspects of smoking. Sample experiments with 19 heavy smokers were run to test the validity of the preparation. It was found that the preparation was reliable and permitted relatively unobtrusive monitoring of smoking performance. Cigarette smoking was found to occur in orderly patterns within subjects; it varied as a function of number of cigarettes provided and hours of smoking deprivation. (Auth. Abs. Mod.)

**81-0553.** Henry, D. J. *Accuracy in the Perception of the Personality Traits of Cigarette Smokers by Smokers and Nonsmokers.* Master's Thesis, California State University, Long Beach, University Microfilms International 13-10602, August 1977, 33 pp.

This study examined the accuracy with which 81 male and 106 female subjects (including 107 never-smokers and 39 ex-smokers), volunteers from university psychology classes,

perceived the personality characteristics of cigarette smokers. The kernel of truth theory proposes that a group stereotype contains at least an essence of truth, and this was tested. Accuracy was measured in terms of the extent to which subjects correctly differentiated between smokers and non-smokers on a set of six traits known to be related to smoking behavior and on seven which were unrelated to smoking behavior. As predicted, subjects accurately perceived these differences and similarities,  $F(1,121) = 19.394$ ,  $p < 0.001$ . These results were interpreted as supporting the kernel of truth theory, at least for this group. There was no significant interaction between subject's sex, target person's sex, and target person's smoking behavior, or between subject's smoking habits and target person's smoking behavior. (Auth. Abs. Mod.)

**81-0554.** Hill, P. C. *The Impact of Immediate Physiological Consequences Versus Long-Term Health Consequences on the Smoking Beliefs, Intentions, and Behavior of Adolescents.* Doctoral Dissertation, University of Houston, University Microfilms International 79-27145, Summer 1979, 144 pp.

Though the overall rate of cigarette smoking has declined in the past decade, it has increased among adolescents, especially girls, despite extensive dissemination of material warning individuals of negative health consequences. This study contends that the traditional long-term health messages of cigarette smoking do not fit within the younger adolescent's limited time perspective and, as a result, are of minimal effectiveness in altering smoking behavior. It may be that the efficacy of a message containing warnings about the negative effects of cigarette smoking would be more acceptable if such warnings focused upon the immediate physiological consequences which are much more probable and personally applicable, especially when the target is a group of adolescents. A sample of 331 ninth grade students from Pasadena Independent School District participated in the study that was designed to test this hypothesis. One group was shown a long-term consequence film (lung cancer and heart disease) and a second group was shown an immediate physiological effects film (increased heart rate and blood pressure as well as the entrance of carbon monoxide into the body). Questionnaires were administered before the film, immediately following the film, 5 weeks later, and 9 weeks later. A third group participated by only filling out the questionnaire at all four administrations while a fourth group was administered the questionnaire only at the pretest and final posttest. The results were not generally supportive of the theoretically based contentions. The two message groups did not significantly differ from each other or the control groups in their behavior, intention, or belief change between the pretest and the final posttest. Even when selected subsamples (e.g., regular smokers in all four measurement periods) were tested, no significant treatment effects were found. However, there was a consistent change in beliefs of both the long-term and short-term consequences of smoking. Several methodological and conceptual difficulties are discussed which may account for the nonsignificant results. It is concluded that this line of

investigation, because of its strong theoretical base, should be continued in an effort to develop a program which can more effectively deal with the problem of adolescent cigarette smoking. (Auth. Abs. Mod.)

**81-0555.** Incagnoli, T. *The Relation Between Locus of Control, Smoking Behavior and Death Anxiety in a Chronic Lung Population.* Doctoral Dissertation, St. John's University, New York, University Microfilms International 79-00267, 1978, 155 pp.

The purpose of the present study was to examine the relationship between locus of control and smoking behavior to death anxiety in a chronic lung population. Several supplemental issues were also studied. These included attempts to quit smoking, attempts to reduce smoking, and attitudes toward joining a stop-smoking group. Subjects for this study consisted of 80 male veteran outpatients in whom the diagnosis of chronic lung disease had been medically verified. After completion of several questionnaires and tests, the latter including the Templer Death Anxiety Scale and the Levenson Scale, subjects were randomly assigned to either an experimental or a control condition. Subjects in the experimental condition were shown a film on the deleterious effects of smoking while subjects in the control condition were shown a neutral film. After the film presentation, subjects retook the Templer Death Anxiety Scale. Results were analyzed in four parts. The first section dealt with mean locus of control scores which were computed for each of the three locus of control scales. Chronic lung patients who smoked were not found to be more chance oriented than those individuals who had ceased smoking. In the second section, each of the locus of control scales was divided into quartiles and means of prefilm and postfilm death anxiety scores were reported as a function of each of these quartiles. Neither smoking behavior nor locus of control or an ensuing interaction of these factors was related to death anxiety. There was no significant increase in prefilm and postfilm anxiety difference scores as a function of the film. The third section was concerned with correlation matrices for the three locus of control scales and prefilm and postfilm death anxiety scores. There was a high and significant correlation between prefilm and postfilm death anxiety scores, regardless of smoking behavior. Part four consisted of both mean locus of control scores and mean prefilm and postfilm death anxiety difference scores for the several supplemental analyses previously mentioned. There was no relation between internality and attempt to quit or reduce smoking. Also, there was no relation between prefilm and postfilm death anxiety difference scores for smokers when these scores were a function of stated responses of attempt to quit or reduce smoking. The film did not increase death anxiety differentially for those who had or had not attempted either to quit or to reduce smoking. (Auth. Abs. Mod.)

**81-0556.** Kingsley, R. K. *The Relationship of Long Term Smoking to Short Term Memory and Abstract Reasoning.*

Doctoral Dissertation, Hofstra University, University Microfilms International 78-14973, 1978, 76 pp.

The purpose of the present study was to examine the relationship of long-term smoking to reductions of short-term memory and abstract thinking. A sample of 57 males, aged 27-75, composed of smokers, ex-smokers, and nonsmokers were given a booklet containing the Conceptual Level Analogies Test, a list of 60 depth-of-processing questions, and a questionnaire having to do with smoking behavior, age, education, and physical health. For the depth-of-processing questions, a 3 x 3 x 2 factorial design was used. The first factor was smokers vs. ex-smokers vs. nonsmokers, a between-subjects variable. The second factor was three levels of processing, and the third factor was affirmative vs. negative response. The second and third factors were within-subjects variables. For the Conceptual Level Analogies Test, a stepwise multiple regression analysis was performed, in which smoking was included and excluded in pairs of statistical models, such that the contribution of smoking to criterion variables was evaluated. In addition to smoking, age, and years of education were considered as predictor variables. Assignment of participants to treatment conditions other than smoking was at random, stratified within subject source. Results indicated that smoking behavior was not significantly related to performance on the short-term memory task. The depth-of-processing study showed older participants able to perform as well as college students on this task. Results of the Conceptual Level Analogies Test were less clear. Although the variable, number-of-years smoked, significantly increased the amount of explained variance, the regression model could not completely control the confounding of the years-smoked variable with the variables age and years of education. Scores of the smokers and ex-smokers ranged widely, with older men scoring lowest; the nonsmokers' range of scores was very narrow. The variance of nonsmokers' scores differed significantly from that of the other two groups. Results also showed a moderate positive correlation of 0.54 between the subjects' performance on the two tasks. A need for replication of this study with a larger, more heterogeneous sample of males and females was discussed. (Auth. Abs. Mod.)

**81-0557.** Knott, V. J. *Reaction Time, Noise Distraction and Autonomic Responsivity in Smokers and Non-Smokers. Perceptual and Motor Skills* 50(Part 2): 1271-1280, June 1980.

Nonsmokers (n=8), low-arousal smokers (n=8), and high-arousal smokers (n=8) were exposed to intermittent, aperiodic noise of 100 decibels (db) (A) while performing a choice reaction-time task. The former were smokers who experienced their strongest need to smoke in low-arousal situations characterized by, e.g., monotony and low-level stimulation, while the latter experienced their strongest need to smoke in high-arousal situations characterized by anxiety and high-level stimulation. Behavioral measures of decision time and movement time were examined together with tonic and phasic measures of skin conductance and heart rate during noise and in response to a single high intensity 100 db (A) auditory tone.

Relative to a noise-free condition, noise significantly impaired decision time of smokers ( $p < 0.0005$ ) and this was paralleled by autonomic response measures to tone stimulation which were reflective of less efficient defensive response mechanisms to aversive stimulation. Significant differences were also observed between low- and high-arousal smokers ( $p < 0.001$ ). (Auth. Abs.)

**81-0558.** Kolonel, L. N.; Lee, J. **Husband-Wife Correspondence in Smoking, Drinking, and Dietary Habits.** *American Journal of Clinical Nutrition* 34(1): 99-104, January 1981.

In order to determine the extent of correspondence between husbands and wives in their personal habits, a sample of 281 spouse pairs was interviewed regarding their smoking, drinking, and dietary habits. Individuals were all volunteers from the Health Surveillance Program in Hawaii, and included Caucasian, Japanese, Chinese, Hawaiian, and Filipino ethnic groups. Both aggregate and within-pair agreements were examined. There was good correspondence between husbands and wives for a majority of the food items, the exceptions being foods that are more likely to be eaten away from home. While the agreement on wine consumption was also good, there was little correspondence between husbands and wives in their patterns of beer consumption and cigarette smoking. Among the pairs, the median for smoking habit in husbands and wives was 10 vs. 0,  $p < 0.01$ , respectively. The findings indicate that the diets of husbands and wives are generally similar and that the circumspect use of spouses as surrogates for dietary information in epidemiological studies can be appropriate. (Auth. Abs. Mod.)

**81-0559.** Lund, D. A. **Social Anchorage and the Initiation of Teenage Cigarette Smoking.** Doctoral Dissertation, University of Utah, Salt Lake City, University Microfilms International 80-04430, December 1979, 181 pp.

The smoking initiation process was studied by testing the efficacy of the symbolic interactionists' concepts of social anchorage and clarity of self-conception, and also by identifying specific sources of social anchorage which are related to cigarette smoking and nonsmoking. These concepts were measured empirically by the Twenty Statements Test. A total of 718 students in grades 7 through 12 from two public school districts within the Salt Lake metropolitan area were administered 30-minute questionnaires. Findings indicated that the selected interactionist concepts do contribute to an understanding of cigarette smoking among teenagers and that relevant sources of social anchorage can be identified. Those with low social anchorage were more likely to be cigarette smokers than were those with high social anchorage. Those with high clarity were less likely to be smokers than were those with low clarity. Of the five specific social anchorage identifications or sources of social anchorage investigated, only kinship was found to be significant in distinguishing nonsmokers from smokers ( $p < 0.01$  for males and females). The influence of the remaining four sources of social

anchorage (student, gender, religious affiliation, and age) were not found to be significantly related to the initiation of cigarette smoking. (Auth. Abs. Mod.)

**81-0560.** McKennell, A. C. **Bias in the Reported Incidence of Smoking by Children.** *International Journal of Epidemiology* 9(2): 167-177, 1980.

Factors which bias self-reports of smoking behavior were studied using a balanced sample of over 4,000 boys and girls aged 11-16 years drawn from 48 British secondary schools. It was found that, for boys, the reported incidence of those smoking  $\geq$  one cigarette/week tends to increase when the questionnaire is self-administered rather than completed by an interviewer ( $p < 0.1$  for boys 14-16 years at home), when the answers are obtained in school rather than in home interviews (boys 11-13 years,  $p < 0.01$ ), and, in school, when children were interviewed together in classrooms rather than individually (boys 11-13 years,  $p < 0.05$  and boys 14-16,  $p < 0.01$ ). These effects did not reach statistical significance level for girls and were most pronounced for the younger boys. Among the latter there was nearly a fivefold difference between the incidence reported in classroom and home oral interviews. For younger boys and girls it was found too that the inclusion of a persistently probing question about trying even one cigarette increased the numbers admitting to regular smoking (boys 11-13 years,  $p < 0.01$  and girls 11-13,  $p < 0.1$ ), while an emphasis on the confidentiality of the interview produced a decrease, not an increase, in admissions (for all groups except boys 14-16 years,  $p < 0.05$ ). The presence or absence of parents was not found to influence the reports of smoking obtained in the home interviews. It was concluded that prevalence estimates from studies of children's smoking are highly contingent, especially for younger boys, on the method by which the data are obtained. Comparability would be aided if reports of study design would include more detail on those aspects which have been shown to produce bias. The correlations reported in many studies between the level of smoking and other variables should be independent of biases affecting estimates of the level itself. But care needs to be exercised in interpreting correlations with variables, such as parental strictness, which could themselves be a cause of response bias. The relative strictness of parents versus teachers was found to be associated with the bias in response between the home and school interview conditions. At the same time a negative correlation was found for older children between the amount of smoking reported and parental punishment for smoking, and this correlation replicated in all interview conditions. (Auth. Abs. Mod.)

**81-0561.** Mechanic, D.; Cleary, P. D. **Factors Associated With the Maintenance of Positive Health Behavior.** *Preventive Medicine* 9(6): 805-814, November 1980.

Various factors associated with positive health behavior—an index based on eight measures of health response such as seat belt use, smoking exercise, and risk-taking—were ex-

amined. Smoking was related to seat belt use (-0.23), preventive medical care (-0.12), and exercise (-0.20),  $p < 0.05$ . Women had more positive scores than men, reflecting a higher level of drinking and risk-taking among men, and a lower level of preventive medical behavior. Other predictors include education and a conventional behavioral orientation. Positive health behavior is associated with both psychological well-being and subjective health status. The patterns of associations found support the hypothesis that positive health behavior is part of a complex lifestyle that may reflect the ability to anticipate problems, mobilize to meet them, and cope actively. (Auth Abs. Mod.)

**81-0562.** Modolo, M. A.; Minelli, L.; Cicchitelli, G. **Smoking Habits in Italy.** *World Smoking and Health* 5(3): 34-36, Autumn 1980.

The results of various smoking surveys conducted in Italy are presented. The surveys conducted in 1962 through 1977 studied the smoking habit of young workers, students, teenagers, adult males aged 44-59, and adults in general, and the effect of family influence, girl/boyfriend influence, and health risk knowledge. Among the major findings was an increase in female student smokers but a decrease in male student smokers. Family smoking habits were found to influence the habits of the children. The smoking habits of the girl/boyfriends of young workers were found to be significantly influential ( $p < 0.0005$ ). Health education programs on smoking were developed in 1979.

**81-0563.** Neetz, R. A. **The Effect of Smoking Deprivation on Psychomotor Performance, Mood, and Task Perception of Female Smokers.** Doctoral Dissertation, University of South Dakota, University Microfilms International 79-28061, July 1979, 91 pp.

The present investigation examined the effects of smoking deprivation of female smokers on complex psychomotor performance, mood, and task perception. Subjects were tested on two separate days on a complex psychomotor device. Four component tasks were represented in this device: tracking, vigilance, reaction time, and information processing. Subjects were assigned to treatment groups as follows: a smoke (day 1) then smoke-deprived (day 2) group ( $n = 5$ ), a smoke-deprived (day 1) then smoke (day 2) group ( $n = 5$ ), a smoke (day 1) then smoke (day 2) group ( $n = 5$ ), and a smoke-deprived (day 1) then smoke-deprived (day 2) group ( $n = 5$ ). The investigation was divided into two studies. Study 1 compared the former two groups (S-D and D-S) on each day, while study 2 compared the latter two groups (S-S and D-D) on each day. During the smoke sessions, all subjects were encouraged to smoke freely, while no smoking was allowed during the smoke-deprived sessions. Each subject responded to a Mood Adjective Check List (MACL) before and after each session, and to a task perception check list after each session. Psychomotor performance measures collected included time on target (TOT), frequency off target (FOT), mean duration

on target (DOT), vigilance correct response (VCR), mean vigilance reaction time (RT), and problems correct response (PCR). Mood measures were mean ratings on eight mood dimensions: aggression, anxiety, surgency, concentration, fatigue, affect, egoism, and sadness. The task perception measure was a mean positiveness rating of the task. Results of these analyses in study 1 revealed no significant performance differences between the S-D and D-S groups on either day of testing. The results of study 2 suggested superior performance by the D-D group on the mean dependent measures of DOT and RT on day 2. No performance differences were found between the S-S and D-D groups on day 1. Significant differences were found in study 1 on the mood factors of aggression and concentration on day 1 ( $p < 0.05$ ). Subsequent analyses showed these effects were associated with greater aggression and lesser concentration on posttest administration of the MACL in the D-S group. This group also demonstrated less concentration than the S-D group on day 2. The only mood effect identified in study 2 showed the S-S group more fatigued than the D-D group on posttest administration of the MACL on day 1. No group differences were obtained on the task perception measure in either study. (Auth. Abs. Mod.)

**81-0564.** O'Connor, K. **The Contingent Negative Variation and Individual Differences in Smoking Behaviour.** *Personality and Individual Differences* 1(1): 57-72, 1980.

The aim of the experiment was to examine evidence for a relationship between extraversion, smoking effects, and event-related cortical measures. Sixteen extraverted and 16 introverted smokers, drawn from the general population, and matched for age, sex, and neuroticism, participated as paid volunteers. Vertex electroencephalogram (EEG) and eye movements were recorded during a warning stimulus—response stimulus—motor response paradigm. Foreperiod duration varied between a regular interval series (1.25 sec) and an irregular interval series (1.25/4.00 sec) with both simple and choice reaction time conditions. Eight artifact-free trials were averaged from each condition for each subject, within both a sham-smoking and a real-smoking session. Analysis of variance revealed significant personality group by sessions interaction effects for both contingent negative variation (CNV) and visually evoked response measures. Peak CNV amplitude was found to be greater in extraverts during real-smoking and greater in introverts during sham-smoking sessions which supported previous findings relating to the biphasic arousing properties of smoking. However, component measures taken on the CNV waveforms under the longer foreperiod interval indicated differences in shape as well as amplitude of the CNV responses elicited under smoking. In extraverted smokers the early orienting component of the CNV was more pronounced during sham smoking, but during real smoking the later E wave component became more prominent. Introverted smokers on the other hand showed a decrease in E wave amplitude from sham- to real-smoking sessions. A model involving personality differences in attentional strategies employed during sham- and real-smoking sessions is

proposed to account for CNV morphological differences. Group differences in EEG, performance, and puff volume measures over foreperiod conditions suggested that smoking accompanied enhanced stimulus selectivity in introverts, but enhanced response preparation in extraverts. Possible brain mechanisms responsible for the interaction between nicotine effects and personality-specific attentional strategies are discussed. (Auth. Abs.)

**81-0565.** Philip, L. *Cognitive, Affective and Conative Health Behaviour of Smokers and Non-Smokers.* *Indian Journal of Social Work* 41(1): 35-44, April 1980.

An exploratory study to examine variables related to the smoking habits of senior officers in selected industries and government departments was undertaken in Calcutta, India. Out of the 290 included in the study 182 responded. This paper presents the findings concerning the knowledge, attitude, and practices of the subjects with reference to smoking and health. No significant association could be observed between knowledge of health hazards caused by smoking and smoking status. However, the degree of positive attitudes and beliefs that connected smoking with ill health was found to affect smoking behavior at a highly significant level. Of the smokers, 14.52 percent felt that smoking was not a health hazard, in comparison to 8.62 percent of the nonsmokers ( $p = \Delta 0.01$ ). Concern for immediate consequences did not significantly influence smoking behavior, though a suggestive trend was indicated for past smokers and never-smokers who had a high degree of concern (76.47 and 75.86 percent, respectively) as compared to current smokers (58.89 percent). Health problems for which a doctor was consulted in the past 5 years did not vary greatly among the smoker categories. However, data on six health problems related to heart, stomach, blood pressure, ear, nose, throat, lung, and anxiety states showed smokers to have more health problems than nonsmokers. (Auth. Abs. Mod.)

**81-0566.** Revill, J.; Drury, C. G. *An Assessment of the Incidence of Cigarette Smoking in Fourth Year School Children and the Factors Leading to Its Establishment.* *Public Health* 94(4): 243-260, 1980.

A survey was taken of the smoking habits and opinions of 1,014 14-year-old schoolchildren in Great Britain in the school year 1977-1978. The results of this survey have demonstrated a continuing high level of cigarette smoking among 14-year-old boys and a marked deterioration in the smoking levels among girls  $\geq 14$  years of age. The incidence of smoking in 14-year-olds has been shown to be significantly ( $p < 0.001$ ) related to academic ability and parental and older sibling smoking habits. The dominant influence in initiating the smoking habit was the influence of friends who were already indulging in the smoking habit. Smoking by children was found to be part of a general pattern of extensive social irresponsibility with regard to school attendance, parental control, and general conformity to the law. There is disregard

of the law by shopkeepers who sell cigarettes illegally to juniors. The place of health education, as a means of preventing children from smoking, was discussed and evaluated. The current level of health education was found to be inadequate in the face of such a serious problem. Even more serious was the evidence indicating that the children are being positively encouraged to disbelieve what they are taught, by powerful counter educational pressures which are operating in society. Evidence of a serious level of addiction to cigarettes was demonstrated in a significant proportion of children. Health education was seen to have an insurmountable task in reducing the level of childhood smoking, if considered in isolation from other approaches. There is a need for strong legal and fiscal measures to support the work of health education if significant progress is to be made in reducing the level of childhood smoking. (Auth. Abs. Mod.)

**81-0567.** Robinson, J. C.; Young, J. C. *Temporal Patterns in Smoking Rate and Mouth-Level Nicotine Exposure.* *Addictive Behaviors* 5(2): 91-95, 1980.

An experiment was performed to determine the temporal pattern of mouth level nicotine exposure and smoking rate in a natural setting. Subjects ( $n=17$ ) smoked cigarettes for 5 weekdays and the mouth level exposures were determined for the 5 periods corresponding to early morning, mid-morning to early afternoon, late afternoon, supper and early evening, and late evening. The nicotine content in the filters of the cigarette butts returned was determined. The highly significant average time period effect ( $\alpha < 0.001$ ) was entirely attributable to the difference between average daytime and evening mouth level exposure (MLE). The average MLE/period for the three daytime periods was 3.07, 3.03, and 3.08 while for the two evening periods it was 3.62 and 3.71. Statistical analysis further revealed a highly significant subject  $\times$  period interaction ( $\alpha < 0.001$ ), indicating that there is great variability in individual smoking patterns over the day. (Auth. Abs. Mod.)

**81-0568.** Roeper, B. *Rauchmotivationen Jugendlicher. [Motivation for Smoking by Adolescents.]* Wirtschaftspolitische Studien aus dem Institut fuer Europaische Wirtschaftspolitik der Universitat Hamburg, Heft 50, Gottingen, Vandenhoeck and Ruprecht, 1978, 241 pp., German.

The author of this book attempts to ascertain the reasons why adolescents start smoking by analyzing the whole range of economic, social, and scientific aspects of the problem. Relevant research and reports which originated in the German Federal Republic and other countries are reviewed. The most important up-to-date research results and their relevance are discussed. The literature on the relative significance of cigarette advertising and other factors for starting smoking is critically analyzed. It is concluded that adolescents are motivated to start smoking by a variety of reasons, depending on socio-psychological type and age, rather than by a single reason.



81-0569. Russell, M.A.H.; Wilson, C.; Taylor, C.; Baker, C. D. **Smoking Prevalence Among General Practitioners' Patients.** *British Journal of Addiction* 75(4): 367-373, 1980.

The prevalence of smoking is reported in a representative sample of 2,616 patients attending the surgeries of 28 general practitioners (GPs) in London. Of the men 43 percent and of the women 34 percent were current cigarette smokers. These figures are substantially lower than those of the general population due to a higher proportion of ex-smokers rather than those of never-smokers. Daily cigarette consumption of current smokers, at 19/day for men and 16/day for women, was similar to the general population. The excess of ex-smokers was comprised mainly of those who had stopped smoking recently, possibly due to the current illness causing their attendance at the surgery, and who under natural circumstances would be likely to start smoking again after recovery. Besides current cigarette smokers, this group of recent ex-smokers would seem an ideal target for preventive intervention by GPs. (Auth. Abs.)

81-0570. Schueler, G.; Stransky, M.; Schwarzenbach, F. H.; Epstein, F. H.; Schaer, M. **Rauchgewohnheiten in zwei Zürcher Landgemeinden. [Smoking Habits in Two Rural Communities in the Canton of Zurich, Switzerland.]** *Schweizerische Rundschau fuer Medizin Praxis* 69(45): 1661-1670, November 11, 1980, German.

In the course of a community intervention study about one-half of the population (1,754 men and 1,628 women) of two rural communities in the Canton of Zurich, Switzerland, provided information on their smoking habits. Approximately 50 percent of the men and 26 percent of the women were smokers. One-third of the male smokers smoked only pipes and cigars. Smoking was most prevalent in the 20-34 age group; at this age already 6 percent of the women were heavy smokers. The younger the people the earlier the age at which they began to smoke. About one-half of the current smokers tried to stop at some time; 17 percent of the men and 8 percent of the women were ex-smokers. The results are compared to other Swiss and foreign studies on smoking habits. (Auth. Abs. Mod.)

81-0571. Silvestro, J. R.; Vacc, N. A. **College Students and Alcohol, Marijuana and Tobacco: A Comparison Survey Between 1967 and 1978.** *Journal of Psychedelic Drugs* 11(4): 351-353, October-December 1979.

In order to determine whether college students are using and experimenting with drugs more than ever before, this investigation studied the attitudes of students as to their views on and their use of alcohol, marijuana, and tobacco in 1967 and 1978 at the same university in New York State. The 1967 random sample included 990 students (352 males and 638 females) and the 1978 sample 421 students (151 males and 280 females). The results revealed sizable changes in opinion and behavior with regard to the use of alcohol, marijuana, and

tobacco by college students between the period of 1967 to 1978. The use of alcohol and marijuana appears to be more widespread with few students perceiving these two drugs as detrimental to one's physical, mental, or emotional well-being. In contrast, there was a marked reduction in the percentage of "regular" and "occasional" smokers from 1967 to 1978 and a dramatic increase in the percentage of 1978 students who did not smoke,  $p < 0.001$ .

81-0572. Stepney, R. **Consumption of Cigarettes of Reduced Tar and Nicotine Delivery.** *British Journal of Addiction* 75(1): 81-88, 1980.

The results of 16 previously published studies which have investigated the effect of reduced tar and nicotine delivery on cigarette consumption were analyzed. In 13 of the studies, switching to a lower delivery brand resulted in an increase in the number of cigarettes smoked. The regression of change in cigarette consumption on change in nicotine delivery produced a Y value of 0.59 ( $p < 0.01$ ), clearly indicating a positive relationship between increase in consumption and decrease in delivery. On the basis of the regression line, it was possible to predict that a reduction in nicotine delivery by 50 percent can lead to an increase in consumption of around 9 percent. A 50 percent delivery reduction is equivalent to changing from a middle-tar cigarette brand to a low- and low-to-middle tar cigarette brand. When delivery is reduced by 20 to 30 percent, an increased consumption of around 3 to 5 percent is to be expected.

81-0573. Stepney, R. **Smoking Behaviour: A Psychology of the Cigarette Habit.** *British Journal of Diseases of the Chest* 74(4): 325-344, October 1980.

The persistence of tobacco smoking in the face of often rigorous proscription and, in our own time, despite agreed severe health hazards is a remarkable phenomenon which has not yet been satisfactorily explained. Cigarette smoking is by far the most common form of tobacco consumption and is also the form most closely and clearly associated with disease. The most pressing need in terms of preventive social medicine is therefore for a fuller understanding of the factors which initiate, develop, and maintain the cigarette smoking habit. This review is concerned primarily with the presentation of two approaches to the problem of smoking motivation. One view considers smoking as addiction; the other sees reasons for continued smoking in the usefulness of cigarettes in the control of arousal and the manipulation of psychological state. This is preceded by a brief history of tobacco use, an account of the current prevalence of smoking and of possible nonpharmacological sources of reward and an assessment of the role of nicotine in the cigarette habit. (Auth. Abs.)

81-0574. Supramaniam, V. **Habits and Attitudes of Malaysian Military Doctors Towards Smoking.** *Medical Journal of Malaysia* 34(3): 205-210, March 1980.

A postal questionnaire survey was carried out among Malaysian military doctors from June to August, 1979, on habits and attitudes toward smoking. An 87 percent response rate was obtained. Smoking prevalence was found to be 50 percent. Of medical officers, 45 percent were heavy smokers. Starting age influenced the amount smoked. For example, 68 percent of teenage starters became heavy smokers while of those who started in their twenties, 38 percent were moderate and 45 percent were heavy smokers. Service life had no influence on smoking habits. Attitudes toward smoking varied between the different smoking categories of doctors. In regard to banning smoking at conferences, 81 percent of nonsmoking doctors were in favor as opposed to 36 percent of the smokers ( $p < 0.01$ ). It was stated that a change in the attitudes and smoking habits of the doctors was necessary before antismoking programs could be successful. (Auth. Abs. Mod.)

**81-0575.** Tobacco International. *A New Profile of the Cigarette Smoker.* *Tobacco International* 180(26): 33, December 22, 1978.

Highlights from a cigarette consumer profile developed from the Point of Purchase Advertising Institute/Dupont Consumer Buying Habits Study are summarized. Most customers were found to be in their twenties, to shop three times a week or more, to have children present while shopping, and to have annual incomes of 15,000 to 24,999 dollars. The impact of in-store merchandising was found to be great, with 51.8 percent of supermarket shoppers making their final decision in-store. On the other hand, final in-store decisions rated cigars and pipe tobacco as 72.2 percent, matches at 84.8 percent, and lighter fluids at 100 percent. Cigarette purchases were two and one-half times as great with a display present than with no display. Brand loyalty was also found.

**81-0576.** Troyer, R. J. *Creating Deviance: The Collective Stigmatization of Cigarette Smoking.* Doctoral Dissertation, Western Michigan University, Kalamazoo, University Microfilms International 80-24819, August 1980, 218 pp.

This study focused on the changing norms regarding cigarette smoking. Banned by a number of states in the early 1930s, the behavior was socially and legally accepted during the 1930s, 1940s, and 1950s only to once again become the object of public approbation and official sanctions in the 1970s. Examining events in both time periods, this study attempted to determine how and why this behavior came to be defined as deviant. In explaining the negative public attitudes toward and official restrictions of the habit some commentators had cited the medical evidence that smoking has deleterious health consequences while others had suggested that antismoking strictures were the product of status battles between smokers and nonsmokers. The medical explanation was seen as representing the strain model while the status group conflict view more closely resembles the

social definitionist approach to social phenomena. These two explanations were evaluated through analysis of Government documents, interest group publications, public opinion survey data, mass media records, and personal interview data. The findings for the early 1900s and the current controversy indicate that in both time periods, health allegations against the cigarette were prominent. However, only after specific interest groups took up the cause and used the health argument to support their interests was smoking defined as inappropriate. In terms of the strain and status group conflict models, this study found neither one to be a complete explanation. While strain clearly was not directly related to the redefinition of smoking as deviant, it was also clear that interest groups were able to realize the restrictions because of the existence of strain. In other words, this study shows that strain was the necessary condition while interest groups taking up the cause provided the sufficient conditions for the definition of smoking as deviant. At the same time it was noted that the prosmoking forces were able to have the restrictive measures of the early 1900s reversed by marshaling additional resources in the 1920s. In conclusion it was suggested that similar developments seem to be occurring today as the tobacco industry has begun to mobilize more resources in the conflict. (Auth. Abs. Mod.)

**81-0577.** Varma, V. K.; Dang, R. *Non-Medical Drug Use Amongst Non-Student Youth in India.* *Drug and Alcohol Dependence* 5(6): 457-465, June 1980.

In a survey of nonmedical drug use by 266 nonstudents in the age range 10-24 years, tobacco, alcohol, and cannabis were found to be the drugs more commonly used. Use was greater in males, older age groups, those with lower educational levels, and those from urban areas. In comparison to students, nonstudents' use began earlier, was more regular, and was practically limited to tobacco, alcohol, and cannabis. In a pilot trial of two additional strategies to identify drug users among nonstudent youth, namely cross-validation by fellow employees and verbal group administration of the questionnaire, the number of current users identified was very similar to that found by individual verbal administration, suggesting that these cheaper methods may be useful in some circumstances.

**81-0578.** Waller, D.; Levander, S. *Smoking and Vigilance. The Effects of Tobacco Smoking on CFF as Related to Personality and Smoking Habits.* *Psychopharmacology* 70(2): 131-136, October 1980.

The effects of tobacco smoking on vigilance (Critical Flicker Fusion, CFF) measured by a computerized forced-choice interactive technique was studied in a group of 28 male, moderate (12.8 cigarettes/day) smokers. Subjects participated in a smoking (S) and a nonsmoking (NS) condition each of 1-hr duration. CFF performance was measured during 15 2-min trials in each condition. In the S condition subjects smoked three puffs during each of five pauses between five successive

trials. Vigilance was significantly improved by smoking. An initial sharp increase in CFF performance was noticed with a maximum 8 min after the first puff. Performance was significantly higher in the S condition compared to the NS condition up to 20 min after the last puff. Two extreme groups, based on differences in CFF performance between the S and NS condition, were compared by questionnaires on personality and smoking habits. The most improved group had significantly higher scores in an extraversion scale. Ratings of the effect of smoking on level of alertness indicated that the objective effect of increased vigilance had no counterpart on the subjective level. (Auth. Abs.)

**81-0579.** Wright, S. J. Actor-Observer Differences in Attributions for Smoking: Introducing Ex-Actors and Attributions for Failure to Give Up. *British Journal of Social and Clinical Psychology* 19: 49-50, 1980.

Subjects ( $n=73$ ) at a clinic for hypertension (27 of whom were newcomers and 46 were returning for a 6-month assessment), were used to study the differences in attributions for smoking and for failure to give up smoking among the smokers ( $n=14$ ), nonsmokers ( $n=35$ ), and ex-smokers ( $n=24$ ). The subjects were given questionnaires about smoking and asked to rate the influence of disposition and situation on smoking and ability, effort, difficulty, and luck factors in failing to give up smoking. For causes of smoking, ex-smokers placed more emphasis on situation and disposition ( $p<0.05$  and  $0.1>p>0.05$ , respectively) than smokers. For failure to give up smoking, ex-smokers placed more

emphasis on ability ( $p<0.025$ ) and effort ( $p<0.01$ ) than smokers. Nonsmokers emphasized luck more than the rest ( $p<0.05$ ).

**81-0580.** Wyshak, G.; Lamb, G. A.; Lawrence, R. S.; Curran, W. J. A Profile of the Health-Promoting Behaviors of Physicians and Lawyers. *New England Journal of Medicine* 303(2): 104-107, July 10, 1980.

A pilot survey of a random sample of Massachusetts physicians and lawyers was conducted to obtain a health-promoting behavior profile. A questionnaire was sent to 462 physicians and 500 lawyers in May 1979, and a followup was sent in June 1979. Questionnaires sought information on demographic and social characteristics, recreational and nonrecreational activities, safety habits (e.g., seat belts, handgun in home), diet, sleep, medical history, work satisfaction, and tobacco, alcohol, and drug use. The percentage response rate for physicians was 70 and for lawyers, 67. Nearly 90 percent of respondents did not smoke. Among those who did smoke, however, pipes were preferred among physicians, whereas cigars and cigarillos were preferred among lawyers. Cigarette smoking was uncommon—86 percent of the physicians and 80 percent of the lawyers were noncigarette smokers. Physicians under 40 years were also more likely to be nonsmokers than physicians over 40 years. The reverse was true for lawyers. Also, lawyers not only started smoking at a younger age, but smoked more cigarettes/day.

See also, 81-0379, 81-0393, 81-0396, 81-0417, 81-0586, 81-0588, 81-0592, 81-0612

## SMOKING PREVENTION AND INTERVENTION

**81-0581.** Choi-Lao, A.T.H.; McRae, B. C.; Hastie, K. D. Smoking During Pregnancy—A National Survey on the Curricula in Medical, Nursing, and Physiotherapy Schools in Canada. *Canadian Journal of Public Health* 71(6): 407-411, November-December 1980.

It has been well documented that maternal smoking during pregnancy has adverse effects on the developing fetus. There is also evidence that an increasing number of Canadian women of child-bearing age are smoking and that those who already smoke are smoking more heavily. The prevention and lessening of the effects of maternal smoking represent a sizable problem for health care professionals. As there is some evidence that health care professionals are not being adequately prepared in this area, a national survey was undertaken to evaluate the curricula on maternal smoking during pregnancy in all medical, nursing, and physiotherapy schools in Canada. The results indicate that although smoking

education is felt to be important by the academic staff, little emphasis is being given to this topic in the curricula. Based on the findings, recommendations for possible improvement of the curricula are discussed. (Auth. Abs.)

**81-0582.** de Loes, M.; Dauwalder, H.; Abelin, T. Evaluation einer Schul-Konzentrationswoche zum Thema "Rauchen." [Evaluation of a School Anti-Smoking Week.] *Sozial- und Präventivmedizin* 25(4): 209-210, September 1980, German.

This study examined the effect of week-long antismoking campaigns conducted in the schools in two socially different districts of Bern on parents' attitude toward smoking. Telephone interviews with randomly selected parents of schoolchildren before and after the campaign revealed that 26.7 percent and 71.5 percent, respectively, of the parents in the socially integrated, typical working class "A" district knew

about the campaign, compared to only 6.1 percent and 33.1 percent, respectively, of the parents in the socially heterogeneous "B" working and middle class district. Before and after campaign results indicated that in the A district, 29.8 and 47.5 percent of the parents, and in the B district, 41.3 and 28.5 percent of the parents interviewed acknowledged a cause-effect relationship between lung cancer and smoking. The differences are statistically significant ( $p < 0.01$ ). It is concluded that in fact the campaign reached parents' households and changed their attitude toward smoking. The effect of the campaign is more pronounced in socially integrated communities.

**81-0583.** East, R.; Moreton, W. *Handbook for the Occupational Quit Smoking Programme*. Kingston Polytechnic, Kingston Upon Thames, Great Britain, March 1980, 42 pp.

This handbook advises on the use of materials and special services for a program devised to help workers quit smoking. It is designed to assist occupational health and other personnel at places of employment who wish to run a smoking cessation program. Elements of the 6-week program include extensive advertisement to all employees, arrangements to facilitate employee participation, distribution of no-smoking literature, formation of quit-smoking groups, and promotions and special services, such as medical checkups. The three-phase program consists of a 3-week preparatory stage, ending with the quit-smoking day, a 2-week program to counteract withdrawal effects, and a final phase designed to reduce relapse by getting the smoker to think and act like a nonsmoker.

**81-0584.** Ellis, B. H., Jr.; Indyke, D.; Debevoise, N. M. (Editors). *Smoking Programs for Youth*. U.S. Department of Health and Human Services, National Institutes of Health, National Cancer Institute, NIH Publication No. 80-2156, June 1980, 102 pp.

This book was compiled by the National Cancer Institute's Office of Cancer Communications as a comprehensive overview of information and issues in the area of smoking and youth. It is intended to provide information necessary to understand the youth smoking problem and to stimulate decisionmakers to develop smoking prevention and cessation programs. The study is divided into four major sections: (1) a review of trends in teenage smoking behavior and the major factors that influence smoking initiation; (2) a discussion of approaches to combating smoking in schools, both historical and those currently in use; (3) suggestions for initiating smoking education programs; and (4) a review of current smoking education programs which have been pilot-tested and could be adopted by interested school districts.

**81-0585.** Gray, N.; Daube, M. (Editors). *Guidelines for Smoking Control*. International Union Against Cancer, UICC Technical Report Series, Volume 52, Geneva, 1980, 167 pp.

The UICC has published guidelines to help concerned organizations design, develop, and carry out smoking control programs. The publication deals not with "why" and "whether" the smoking problem should be tackled, but with "how." It was intended to provide a clear plan of action. The handbook discusses the basis of a public information program aimed at increasing popular awareness of the size and complexity of the smoking problem. It also details the elements of antismoking education programs aimed at specific target groups, e.g., schoolchildren, adolescents not in school, and adults.

**81-0586.** Hansen, W. B. *Monitoring Carbon Monoxide in Conjunction With Immediate, Delayed, Withheld, and Vicarious Feedback as a Means of Deterring Smoking in Children*. Doctoral Dissertation, University of Houston, University Microfilms International 78-18237, Spring 1978, 201 pp.

The smoking behavior of 365 sixth-grade children (median age 11 years) was examined in a pretest-treatment-posttest quasi-experimental investigation. Subjects in treatment conditions were presented information about the immediate consequences of smoking and with several forms of direct and vicarious feedback about the levels of carbon monoxide found in their breath. After viewing a film about how carbon monoxide (CO) immediately enters the smoker's body and can be measured in the breath, subjects were given vicarious feedback via a live demonstration of the detection process using smoking and nonsmoking adult models. Subjects in the first feedback condition then had their breath tested for CO and received immediate feedback on the results. A second group received feedback on the CO content of their breath after a 1-week delay, and subjects in a third condition produced breath specimens but were never given feedback on the results. A fourth feedback group was not monitored for CO but did view the vicarious feedback demonstration. An additional treatment group only viewed the CO film while a control group only completed pretest and posttest questionnaires. Statistical analysis of the numbers of smokers in the treatment and control groups indicated that the proportion of subjects who reported smoking in the information only and the delayed feedback conditions were respectively reduced and maintained while subjects in the groups that received immediate and withheld feedback reported substantial increases in the numbers of smoking subjects. Subjects were found to consistently underestimate the occurrence of long-term consequences (cancer and heart trouble) and overestimate the occurrence of short-term consequences (CO and increased heart rates). They also estimated consequences as occurring later for generalized others than for themselves. Beliefs about the occurrence of consequences were not predictive of subjects' behavior. However, distant past behavior was meaningfully related to subjects' current smoking patterns, suggesting that even by the sixth grade, significant patterns of behavior had developed. Overall, this study suggests a social-psychological technique for presenting meaningful information to children which may be used to reduce

or deter experimenting with the use of cigarettes. (Auth. Abs. Mod.)

81-0587. Kallmeyer, K. *Erfahrungen über Aufklärungsaktionen zum Rauschmittel-, Raucher- und Alkoholproblem in Schulen.* [Experience With Information Campaigns in Schools on the Problems of Drugs, Smoking and Alcohol.] *Oeffentliche Gesundheitswesen* 42(5): 251-254, May 1980, German.

A campaign of education and information on smoking and alcohol problems was launched by the Public Health Office in 1974-75 in junior high schools and in 1977 in high schools in the Munich District. The campaign consisted of film presentations followed by discussion. Adult smoking, early smoking by girls, and risks to the unborn child due to smoking and alcohol abuse by the expectant mother were preferred discussion topics. Students in a junior high school class designed posters on the subject of smoking. Generally, students in elementary schools displayed varying degrees of interest but those in high schools showed relatively little interest in the presentations.

81-0588. Lammers, J. W. *The Influence of the School Health Curriculum Project on Children's Knowledge, Attitudes and Decisions Concerning Cigarette Smoking.* Doctoral Dissertation, University of Utah, University Microfilms International 80-25299, June 1980, 91 pp.

The effect of the School Health Curriculum Project (SHCP) on the general health knowledge, attitudes, and cognitive aspects of decisions concerning cigarette smoking was studied among a sample of fifth grade students from 30 schools in Arkansas. Of these schools, students from 15 served as the experimental subjects and 15 as the controls. The former participated in the SHCP in the fall of 1979, the latter were to do so in the spring of 1980. Schools were matched on three criteria: (1) the number of culturally and educationally disadvantaged children in the district (indicated by Title I figures), (2) the percentages of black and white students in the district, and (3) the size of the community in which the district was located. Three instruments were chosen to measure subjects' achievements in the three major areas of knowledge, attitudes, and decisionmaking. Since the knowledge test was given as a posttest measure only, a t-test was used to determine significant differences between the groups. No significant differences were reported ( $p=0.238$ ). Multiple analysis of variance procedures were used to compare the groups on "attitudes toward myself" and "a cigarette smoker." A significant difference was reported on "attitudes toward myself" between the two groups ( $p=0.02$ ). No significant differences were reported between groups on "attitudes toward a cigarette smoker." Analysis of the decisionmaking variables revealed significant differences between the subjects on five separate variables ( $p=0.05$ ). Multiple analysis of variance procedures were computed on three variables indicating the number of health, social, and total of reasons cited for choosing to smoke or not to smoke.

Additionally, the number and kind of reasons given for choosing to smoke or not to smoke were analyzed descriptively. All comparisons indicated the experimental subjects gave more health reasons for their decisions regarding cigarette smoking, fewer social reasons, and more total reasons for their decisions than the control subjects. Overall, the SHCP did not affect general health knowledge and attitudes of students concerning cigarette smoking. However, the project did affect the students' attitudes about themselves and decisionmaking concerning cigarette smoking. Most importantly, the experimental subjects reported a significantly higher number of health reasons and total reasons in their decision related to cigarette smoking. The experimental subjects also reported behavioral intentions not to smoke at a significantly higher rate than the control subjects. It would seem that the SHCP results in children applying relevant knowledge to making decisions about health. (Auth. Abs. Mod.)

81-0589. Lynch, B. S. *The Primary Grades Health Curriculum Project.* U.S. Department of Health, Education, and Welfare, Center for Disease Control, Bureau of Health Education, DHEW Publication No. (CDC) 80-8382, 1980, 35 pp.

A health curriculum project aimed at children in the primary grades is described and evaluated. The following components make up the project: health content—presentation of body structure, functions, senses, and feelings; use of innovative resources other than textbooks; a teacher training program; community involvement; and integration of subject areas other than health such as reading and art. Pretest and posttest evaluations of the program in 1977 and 1978 show that kindergarten children showed significant gains and positive changes in attitudes ( $p<0.005$ ) with knowledge about good health and nonsmoking. A 1979 report indicated about 14 percent of the families with children in the project reported smoking reduction or quitting.

81-0590. MacPherson, B. V.; Ashikaga, T.; Dickstein, M. S.; Jones, R. P., Jr. *Evaluation of a Respiratory Health Education Program.* *Journal of School Health* 50(10): 564-567, December 1980.

A respiratory health program, using three different curricular approaches, aimed at rural elementary school students in Vermont was implemented and evaluated. Each educational approach emphasized four themes: respiratory structure and function, respiratory disease, community health, and consumer health, and utilized either (1) a mobile unit equipped with many nontraditional learning aids about the respiratory system such as a smoking machine demonstrating tar and nicotine accumulation, (2) a traditional classroom curriculum aimed at respiratory health education, or (3) a combination of both approaches. In the fall of 1977, before exposure to the health curriculum, completed survey questionnaires were returned from 1,750 pupils in 85 classrooms, and after curriculum exposure, in the spring of 1978, from 1,683 pupils

in 80 classrooms. A control group of 345 pupils in 19 classrooms were surveyed in the spring only. Cognitive, attitudinal, and behavioral changes after each of the different treatment approaches and the controls were determined and compared. The cognitive scores increased significantly in all three classroom curriculum groups when compared to the control classroom group. There was no significant improvement in any of the groups for attitudinal scores when compared to the control. No significant changes were observed in behavior; in fact, all three groups showed more deterioration in the criteria of change in reported cigarette use than the control group. However, the 35 percent spring rate of past smoking in the traditional schools was within the 36 percent fall rate reported in control schools. This health program did increase the respiratory health knowledge of the students, with the combination approach being more effective than either of the individual ones.

**81-0591.** Perry, C. L.; Killen, J.; Slinkard, L. A.; McAlister, A. L. *Peer Teaching and Smoking Prevention Among Junior High Students.* *Adolescence* 15(58): 277-281, Summer 1980.

A smoking prevention program for junior high students which utilized older students as teachers and role models is reported. Groups of six to eight high school students formed "peer" teaching teams to help the junior high students identify and resist pressure to smoke. A class of 289 seventh graders were used as the treatment group in the 1977-78 and 1978-79 school years. Two other area schools provided a control group of 400 students. Current smoking behavior was evaluated through self-reports in September 1977, June 1978, and December 1978. In June 1978 there was a significant difference in prior week smoking behavior between treatment and control groups ( $p < 0.01$ ) which persisted in December 1978 ( $p < 0.025$ ). Additionally, in response to the question, "Have you smoked in the past month?", the percent affirmatively responding in December was 13.8 in the treatment school ( $p < 0.005$ ), 21.7 in control school 1, and 28.7 in control school 2. The results indicate the possible success of a smoking prevention program based on the social learning principles used in this study.

**81-0592.** Roberts, S. *Belief Assessment as a Component of Curriculum Planning: Cigarette Smoking as an Example.* *Journal of School Health* 50(10): 555-558, December 1980.

A methodology for determining differences in smokers' and nonsmokers' beliefs and evaluations concerning cigarette smoking is presented for usage in improving the effectiveness of traditional health education curricula. A group of 142 college women (18- and 19-year-olds) was assessed for perceptions and beliefs about smoking and for evaluation of the consequences of smoking through their answers on a closed-format questionnaire. The results showed a significant difference between smokers ( $n=42$ ) and nonsmokers ( $n=100$ ) in their beliefs and values ( $p < 0.01$ ). For example, the smokers only slightly believed that smoking was a health

hazard, would increase risk of cancer, or cause breathing problems while nonsmokers believed more strongly. Smokers also believed that smoking led to relaxation, that cigarette smoke tasted good, that smoking was not offensive to others, and that smoking led to keeping weight down, whereas nonsmokers were much more convinced that these consequences were not the outcome of smoking. Smokers also valued highly the consequence of having something to do with one's hands. The findings are proffered in order that health educators are encouraged to assess their students' salient beliefs and evaluations as well as their own, and that shifts in belief and evaluation scores be assessed by questionnaire before and after instructional classes.

**81-0593.** Schmidt, F. *10 Jahre Arztlicher Arbeitskreis Rauchen und Gesundheit. Ruckblick und Ausblick.* [Ten Years of the Medical Committee on Smoking and Health. Past and Future.] *Fortschritte der Medizin* 98(18): 714-717, May 15, 1980, German.

Antismoking activities of the German Committee of Physicians on Smoking and Health from 1969 to 1979 are reviewed. Within this period the committee expanded from the original 3 to 1,300 members. The committee's activities included publications in German medical journals, correspondence with Federal and State authorities, organization of conferences, introduction of antismoking programs, and lobbying for legislative reforms. Among various measures proposed is a government decree to allow the exclusive use of raw (unprocessed) tobacco in cigarettes which would produce irritating (alkaline) smoke, thus preventing inhalation, and hence, make cigarette smoking less dangerous to health. The most recent (1979) activities of the committee are oriented toward influencing public opinion and supporting protection of nonsmokers. Progress in smoking control is noted on several levels. Official German statistics are cited on mortality and disability from smoking-associated cancers and other diseases.

**81-0594.** Senties V., R.; De la Rosa Medina, J. *Centro Orientador de Fumadores.* [Smokers Advice Center.] *Salud Publica de Mexico* 20(4): 471-484, July-August 1978, Spanish.

This is a report of the initial experience of the Smokers

This educational activity is neither intended to eradicate tobacco smoking, nor to put a circle of restrictions around the society on use of cigarettes or drugs, but to reduce the danger while our societies become not only somatically but also psychosocially more healthy. This initial experience encourages recommendation for the multiplication of Advice Centers as an expression of policy in which the Health Services should not be restorers of damage, but promoters in a change

of attitude toward social problems in the communities. The use of tobacco is tolerated because it shows no changes in the physical or moral appearance and because the damages take years to appear. In relation to these well-established disadvantages, a controlled educational process is the only feasible mechanism to create less susceptible generations. (Auth. Abs. Mod.)

## SMOKING CESSATION METHODS

**81-0595.** Berlin, F. S. *Smoking Decreased After Hypnosis.* (Letter). *Archives of General Psychiatry* 37(10): 1200-1201, October 1980.

In order to determine whether persons who might respond to hypnotic suggestions to smoke less could be identified prior to such an attempt, 498 volunteer undergraduate students were administered the Harvard Group Scale of Hypnotic Susceptibility (HGS) by tape recording. There were 42 percent who had scores indicating low susceptibility, 29 percent medium susceptibility, and 29 percent high susceptibility. From each of the high- and low-scoring groups, 15 cigarette smokers were selected for further participation. Each participant was asked to keep an accurate daily record of cigarettes smoked over a 60-day period. On day 31, 20 of the 30 subjects, in groups of 2 or 3, received tape-recorded suggestions to smoke less. Of the 20, 10 received these instructions after hypnotic induction and prior to awakening, and 10 received the instructions just after awakening. Control participants ( $n=10$ ) were hypnotized and awakened on day 31 without being given any instructions. Analysis of covariance found statistically significant ( $p<0.001$ ) effects on frequency of smoking after treatment that were attributable to having a high HGS score and to type of treatment (i.e., hypnotic suggestions vs. waking instructions vs. no instructions). The persons with high HGS scores who were exposed to either hypnotic or waking instructions also had significant ( $p<0.01$ ) differences in smoking frequency. The HGS score group with hypnotic suggestion smoked 1,104 fewer cigarettes during the 30-day posttreatment period than pretreatment consumption.

**81-0596.** Bier, R. S. *Assisted Covert Sensitization and Smoking Cessation.* Doctoral Dissertation, University of Texas Health Science Center, Dallas, University Microfilms International 79-02523, August 1978, 138 pp.

A total of three behavioral group treatment techniques were evaluated for effectiveness in modifying chronic cigarette smoking. Volunteer participants ( $n=84$ ) were randomly assigned to 1 of 3 treatment conditions: (1) covert sensitization, (2) covert reinforcement, and (3) assisted covert sensitization. In addition, measures of imaginal capacities were

obtained both at pretreatment and posttreatment in order to investigate the relationship between these measures and treatment outcome. At the end of treatment, subjects in all conditions significantly decreased smoking behavior ( $p<0.0001$ ) and no significant between-group differences emerged. Although relapse occurred, the smoking rates at 3-month followup were still significantly less than baseline for all three groups (groups 1 and 3,  $p<0.0001$  and group 2,  $p<0.01$ ). At this point significant differences emerged with respect to superiority of treatments. Assisted covert sensitization was significantly more effective than covert sensitization in maintaining reduction of smoking behavior ( $p<0.05$ ). There were no significant differences between the covert sensitization treatment group and the covert reinforcement treatment group. Most importantly, assisted covert sensitization was significantly more effective than covert sensitization and covert reinforcement in maintaining abstinence of smoking behavior. Measures of imaginal capacities were not significantly related to treatment outcome. (Auth. Abs. Mod.)

**81-0597.** Colletti, G. *The Relative Efficacy of Participant Modeling, Participant Observer, and Self-Monitoring Procedures as Maintenance Strategies Following a Positive Behaviorally Based Treatment for Smoking Reduction.* Doctoral Dissertation, Rutgers University, New Brunswick, New Jersey, University Microfilms International 78-5068, October 1977, 153 pp.

The present study tested the hypotheses that (1) experiencing a participant modeling maintenance strategy would result in superior maintenance of smoking reduction relative to appropriate controls and (2) that participant modeling as a source of self-observation would enhance self-attribution of positive results of attempts at smoking reduction. The immediate and long-term efficacies of experiencing a positive, behaviorally based smoking reduction procedure followed by a maintenance strategy were also evaluated. After receiving an identical, positive, self-directed treatment package, 42 subjects were randomly assigned to one of three maintenance strategies: Participant Modeling (PM)—a treatment procedure designed to maximize self-attribution of smoking reduction; Participant Observer (PO)—intended as a control for the additional time and exposure to treatment available for

PM subjects; and Self-Monitoring (SM)—a minimal treatment phone contact only control. All groups displayed highly significant as well as clinically meaningful smoking reduction at posttreatment, postmaintenance, and 3-month followup. As expected, there were no significant differences between groups at posttreatment or at postmaintenance. Contrary to expectation, at 3-months followup, it was evident that the PM group maintained smoking reduction significantly less well than the PO and SM groups. The behavior, attitudes, and smoking reduction of the PO group, on the other hand, followed the pattern predicted for PM subjects. These unexpected results were interpreted as providing support for the original maintenance and attribution hypotheses. That is, the PM and PO maintenance procedures were reconceptualized—both as participant modeling maintenance strategies, with the PM receiving high inducement for modeling, the PO low inducement. There was correlational support for the self-attribution hypothesis that superior maintenance would be associated with a greater degree of self-attribution across all subjects. The overall maintenance of smoking reduction achieved in the present study, in comparison to previous reports, suggests the immediate and long-term efficacies of the positive, behaviorally based combined treatment and maintenance strategy procedures employed. (Auth. Abs. Mod.)

**81-0598.** Glasgow, R. E. *Effects of a Self-Control Manual, Rapid Smoking, and Amount of Therapist Contact on Smoking Reduction.* Doctoral Dissertation, University of Oregon, University Microfilms International 78-2521, September 1977, 135 pp.

A group of 62 smokers, 32 men and 30 women, with an average age of 32.6 years, and a smoking baseline of 24.7 cigarettes/day was used for a study on smoking reduction. The subjects were randomly assigned to one of four treatment groups. Group 1, minimal contact self-control, and group 2, high contact self-control, received the same multicomponent behavioral treatment manual and instructions for use of rapid smoking and relaxation session treatment techniques at home. These two groups varied only in the amount of therapist contact. Group 3, high contact rapid smoking, was given a standardized rapid smoking version using self control, booster sessions, and cognitive factors, and received therapist-administered sessions identical to Groups 1 and 2. Group 4, high contact normal-paced smoking, received other aversive smoking treatments, including rapid smoking to control for nonspecific treatment effects. Smoking rates were determined as a percent of baseline smoking for all groups at posttreatment (3.4 cigarettes/day) and followup (12.4 cigarettes/day). There was a significant decrease from baseline to followup ( $p < 0.001$ ), but a significant increase from posttreatment to followup ( $p < 0.001$ ). Between-group differences in abstinence failed to reach significance; however, the differences in the effect of the amount of therapist contact were significant ( $p < 0.001$ ).

**81-0599.** Halhuber, C. *Cigarette End. From Ashes to Roses in Seven Sure Steps.* Wellingborough, Northamptonshire, Great Britain, Thorsons Publishers Limited, 1978, 90 pp.

The seven-step stop-smoking program given here is the first of its kind to be published in a book form in Great Britain. It has been clinically tested and 85 percent of the people who stopped smoking with its help were still nonsmokers 5 years later. The author, an ex-smoker, writes for people who really want to stop smoking and are looking for help in putting their resolution into action. The first step in this program is to determine what kind of smoker you are—casual, habitual, or addictive. Do you smoke because you cannot help it, because cigarettes give you great pleasure, or merely because of your contact with other smokers? A self-test enables every smoker to make a correct diagnosis. Having analyzed your smoking behavior you are ready to embark on the nonsmoking training course with your marriage partner, a friend, or a business colleague as your "moral support." (There is a control-table for checking your progress.) The course allows the smoker to determine his own obstacles in training (targets and penalties), withdrawal symptoms and how to deal with them are explained, and some tips and tricks from successful ex-smokers are passed on.

**81-0600.** Hamilton, S. B. *The Effects of Social Support and Paraprofessional Training on the Outcome of a Multicomponent Smoking Abstinence Program.* Doctoral Dissertation, University of Montana, University Microfilms International 78-19147, 1978, 241 pp.

The purpose of the present investigation was to (a) assess the efficacy of a multicomponent smoking abstinence program consisting of self-control training, target-date quitting, rapid smoking, and self-control rehearsal, (b) evaluate the added utility of a maintenance-enhancement package composed of social support and public commitment strategies, and (c) determine the additional benefits to be derived from former participants serving as paraprofessional trainers in a subsequent smoking abstinence program. Two separate treatment programs were conducted, each lasting 3 weeks. Prior to program I, 60 habitual smokers were randomly assigned to one of five conditions: smoking abstinence program (SAP); smoking abstinence program plus social support (SAP-SS); smoking abstinence program, social support, plus paraprofes-



month followup, (b) social support (SS) procedures, in conjunction with SAP, tended to facilitate maintenance (27 percent abstinence at 6-month followup), although subjects relapsed significantly during the first posttreatment month, (c) while paraprofessional training (PT), in conjunction with SAP and SS procedures, produced a 3-month abstinence rate of 64 percent, a significant relapse at the 6-month followup substantially reduced this level to 36 percent, and (d) WL-SAP-SS and EC-SAP-SS subjects achieved 6-month abstinence rates of 36 percent and 55 percent, respectively. Differences between these conditions, while nonsignificant, may have resulted from pretreatment (program I) manipulations. (Auth. Abs.)

**81-0601.** Holroyd, J. *Hypnosis Treatment for Smoking: An Evaluative Review.* *International Journal of Clinical and Experimental Hypnosis* 28(4): 341-357, October 1980.

A total of 17 studies of hypnosis for treatment of smoking published since 1970 were reviewed. Abstinence after 6 months posttreatment ranged from 4 to 88 percent. Effectiveness of treatment outcome was examined in terms of subject population, individual vs. group treatment, standardized vs. individualized suggestions, use of self-hypnosis, number of treatment sessions and time span covered by the treatment, and use of adjunctive treatment. At 6 months followup, >50 percent of smokers remained abstinent in programs in which there were several hours of treatment, intense interpersonal interaction (e.g., individual sessions, marathon hypnosis, mutual group hypnosis), suggestions capitalizing on specific motivations of individual patients, and adjunctive or followup contact. The 17 studies are presented in sufficient detail to permit clinicians to follow the published procedures, and recommendations are made for future research. (Auth. Abs.)

**81-0602.** Javel, A. F. *One-Session Hypnotherapy for Smoking: A Controlled Study.* *Psychological Reports* 46(Part 1): 895-899, June 1980.

A smoking clinic was conducted with three groups of 10 patients receiving a formal induction (hypnotherapy) plus suggestions, suggestions alone, or no treatment. Success rates at 3 months were 60, 40, and 0 percent, respectively. Patients in the first two groups had received followup calls every other day for 1 week, then every week for 3 months, while those in the last group had been contacted once at the end of 3 months. Of the demographic and historical data for the patients, two variables showed statistical significance: history of a mother having smoked as reported by five successful patients compared to one who failed ( $p < 0.05$ ), and history of a smoking-related illness as reported by six who failed compared to four who succeeded ( $p < 0.01$ ).

W. *Hypnosis and the Addictions: A Critical Review.* *Behaviors* 5(1): 41-47, 1980.

The use of hypnosis as a treatment for the addictions (e.g., smoking and alcoholism) has generally been done in a vacuum ignoring the progress made in behavior therapy and self-control techniques. Recent developments in experimental hypnosis and imagery work have clarified the nature of the hypnotic process. Yet these important distinctions have not been reflected in research in hypnosis and the addictions. A new model of hypnosis, the hypnotic skills model, is presented. This model is compatible with recent trends in experimental hypnosis and behavior therapy, especially self-control research. It is argued that use of the skills model in evaluating potential contributions of hypnosis to addiction research will be very valuable. These potential benefits include clarification of essential variables potent in addictions treatment, potential improvement in treatment success, and refinement of self-control, maintenance, and generalization strategies. (Auth. Abs.)

**81-0604.** Keech, S. M. *The Effect of Role Playing Involvement on Modifying Smoking Behavior.* Doctoral Dissertation, University of Denver, University Microfilms International 79-27107, June 1979, 130 pp.

The present study was undertaken to investigate the effectiveness of three levels of role playing involvement in modifying cigarette smoking behavior. In the strategy employed to investigate this study, 57 subjects who smoked 10 or more cigarettes daily were assigned randomly to one of three levels of role playing involvement. The conditions were balanced for number of cigarettes smoked and involvement level. Following the role play conditions, the subjects filled out a semantic differential scale to check on involvement level. Next, they were asked to keep a 2-week log of the number of cigarettes they smoked daily, starting with the following day. Five months later the subjects were telephoned by the experimenter and asked questions about daily activities, such as number of cigarettes smoked. A one-way analysis of variance was used to analyze the data. Although all three conditions of involvement moved the subjects to the predicted direction, the results were: (a) role playing had no significant effect on modifying or eliminating cigarette smoking; and (b) no differences were found between the three levels of role playing involvement with respect to cigarette smoking behavior. No significant differences were found on the self-reported levels of involvement which may explain why no differences were found in the levels of role playing involvement. (Auth. Abs. Mod.)

**81-0605.** Kenigsberg, M. I. *Multicomponent Long-Term Programs for the Maintenance of Smoking Cessation: Efficacy of Rapid Smoking and Self-Control Procedures, Gradual Versus Target-Date Quitting, and Booster Sessions.* Doctoral Dissertation, Pennsylvania State University, University Microfilms International 78-18766, May 1978, 122 pp.

A multifaceted long-term approach to the maintenance of smoking cessation was evaluated in 74 subjects (40 men, 34

women) who had been smoking from 2 to 13 years (mean = 5 years). Treatment was structured into two phases. In the first phase subjects either tapered their smoking rate prior to a quit date or determined their own rate of smoking. They received instruction in self-control procedures and rapid smoking during this time. In the second phase subjects received one of four booster conditions: support and encouragement, rapid smoking, contract management, or no-booster treatment. A no-treatment control group was included for comparison. Results at the 22-week followup showed that groups receiving treatment fared better than subjects receiving no treatment. This difference reached significance ( $p < 0.001$ ) for smoking rate data, but was marginally significant for percent baseline and abstinence data. The marginal nature of these differences was shown to be primarily due to the inclusion of the treatment group which did not receive booster sessions. Subjects in this condition smoked significantly ( $p < 0.05$ ) less cigarettes at followup than untreated subjects, but did not differ in abstinence rates. Booster treatment did improve performance compared to basic treatment without booster sessions but not significantly so. In addition, it was found that the specific booster techniques of rapid smoking and contract management did not differ significantly in their effect from the nonspecific booster treatment of support and encouragement. There was no significant difference in followup performance when smoking rate was tapered or self-scheduled prior to quitting. Possible explanations for the negative findings in this study were outlined. Checks on the accuracy of subjects' self-report showed that both carbon monoxide respiratory air assessments and informant reports were highly correlated with subject reports. (Auth. Abs. Mod.)

**81-0606.** Labadie, J.-C.; Dones, J.-P.; Gachie, J.-P.; Serise, M.; Coudray, P.; Freour, P.; Sasco, A. *Desintoxication Tabagique Resultats a Court et a Long Terme. [Short- and Long-Term Results of Smoking Withdrawal Therapy.] Bordeaux Medical* 13(7): 239-242, 244-246, March 10, 1980, French.

The method of withdrawal therapy consultation used at a French medical center consisted of a preliminary functional and clinical examination of a candidate, followed by an interview, counseling, and chemotherapy. The method was applied to >800 persons. The 598 subjects who came more than once for consultation were subsequently surveyed by mail or telephone. A total of 67.8 percent respondents made up the population sample studied over a period from 6 months to 5 years after initial consultation. Of the sample candidates, 4.9 percent had been smoking 1-10 cigarettes/day and 31.8 percent >30 cigarettes/day. At the time of the first visit, 56.9 percent had altered ventilatory parameters. After a period of consultation varying from 1 to 152 weeks, 83.7 percent of the subjects showed a beneficial effect (completely ceased or reduced smoking). A long-term (6 months to 5 years) beneficial effect was observed in 49.3 percent of the cases, with most relapses (86.3 percent) occurring within the first year. The best chances of long-term success were found in the older subjects, the heaviest cumulative smokers

(>200,000 cigarettes), the regular (>1 month) visitors to the center, those with a nonsmoking spouse, those making the first attempt at withdrawal, and those with improved respiratory function after a period of visits.

**81-0607.** Lennon, L. B. *Covert Sensitization as a Means of Treating Problem Smoking.* Doctoral Dissertation, Miami University, Oxford, Ohio, University Microfilms International 80-01441, 1979, 188 pp.

This study examined the role of various imagined consequences to smoking in a covert sensitization paradigm. Sixty-four subjects (18 males and 46 females with a mean age of 40) who wanted to quit smoking were assigned randomly to one of four treatment conditions. The subjects had been smoking an average of 28.9 cigarettes/day for an average of 21.9 years. Cassette tapes were used to individually administer treatment images. The subjects were first given instructions on muscle relaxation and image formation. They then received a series of smoking scenes with the responses to smoking varying according to the treatment conditions. Those in Condition I visualized themselves relaxing instead of smoking and those in Condition II imagined themselves starting to smoke, but then exerting will power to put the cigarette out. Subjects in Condition III imagined themselves violently vomiting because of their smoking; and those in Condition IV visualized "stimulus-relevant" images of bad breath and cancer due to their smoking. Half the subjects in each condition received two booster sessions consisting of a review of the images they had generated during the treatment phase and the other half received the taped instructions on muscle relaxation. All subjects were instructed to record their smoking on an index card before, during, and 90 days after the treatment. The hypothesis that those subjects who received stimulus-relevant images (Condition IV) would smoke fewer cigarettes 90 days following treatment than those in the other conditions was not supported. The hypothesis that subjects who received treatment booster sessions (2 weeks after treatment) would evidence significantly smaller recidivism rates than those who received the relaxation booster session was not supported. All conditions produced a significant reduction in smoking at the end of the treatment ( $p < 0.001$ ), but shortly thereafter a regression toward the baseline occurred. It was suggested that the positive results obtained at the end of treatment across conditions were due, at least in part, to self-monitoring rather than to any specific treatment variable. The failure to sustain the gains may have been due to the failure of the subjects to continue their self-monitoring. (Auth. Abs. Mod.)

**81-0608.** Malcolm, R. E.; Sillett, R. W.; Turner, J.A.M.; Ball, K. P. *The Use of Nicotine Chewing Gum as an Aid to Stopping Smoking.* *Psychopharmacology* 70(3): 295-296, October 1980.

A total of 210 subjects entered a trial to test the use of a chewing gum containing nicotine as an aid to stopping smoking. They were divided into three groups: nicotine chewing gum, placebo chewing gum, and control. The trial

was double-blind between the two chewing gum groups. After 1 month the percentage of confirmed nonsmokers in the nicotine gum group was 34 percent, in the placebo chewing gum group 37 percent, and in the control group 24 percent. By 6 months most of the nonsmokers had relapsed, but the nicotine gum group (23 percent) was more successful than the placebo (5 percent) or the control group (14 percent). (Auth. Abs.)

**81-0609.** Meyer, A. J.; Nash, J. D.; McAlister, A. L.; Maccoby, N.; Farquhar, J. W. Skills Training in a Cardiovascular Health Education Campaign. *Journal of Consulting and Clinical Psychology* 48(2): 129-142, April 1980.

The aim of this project was to determine the relative effectiveness of two methods, or a combination thereof, for increasing community knowledge of cardiovascular disease risk factors and motivating various dietary, smoking, and exercise changes. Of four groups, two were exposed to a mass media campaign only, one was exposed to a mass media campaign plus face-to-face instruction, and one was a control. The risk factor which showed the most sustained dramatic change was smoking. The mass media campaign against smoking made use of television, radio, newspapers, billboards, posters, and printed material. In face-to-face instruction smokers were taught to decrease smoking gradually. They could choose from a selection of procedures such as alternative behavior substitution and cue disrupting. Cigarette smokers in the group instructed with both methods changed from a mean baseline value of 59.7 percent to -32.5, -47.5, and -50.0 percent change from baseline at three followup surveys. In comparison, from a 62.4 baseline percentage of smokers, the change in smoker percentage in a group receiving mass media instruction only was -15.1, -15.1, and -11.3 at the followup surveys. It was concluded from this program that the combination of both methods was more successful than mass media alone in increasing awareness of risk factors and in motivating and maintaining health behavior changes.

**81-0610.** Neptune, C., III. An Investigation of the Effect of Meditation Training in a Cigarette Smoking Extinguishment Program. Doctoral Dissertation, Kansas State University, College of Education, Manhattan, University Microfilms International 78-11433, 1977, 100 pp.

The study was designed primarily to determine the effect on smoking rate and abstinence rate of training in the human relaxation response when combined with a behavioral-chain interruption smoking modification (meditation training) technique. The sample examined was a group of 90 volunteer subjects from a military population in Kansas. Subjects were randomly assigned to one of three groups: a contrast group ( $T_1$ ), an experimental group ( $T_2$ ), and a no-treatment control group (NT). Members of the  $T_1$  group received a standardized behavioral-chain interruption smoking modification program.  $T_2$  received the same program concurrently with training in eliciting the human relaxation response, and NT

received pretreatment procedures and posttreatment repeated measures identical to the other two groups. The research data was collected by a pretreatment smoking rate baseline report form and by posttreatment measures collected at the end of treatment, 2 weeks and 8 weeks posttreatment. Self-report of daily smoking rate was the source of the criterion measurement. An observer report of randomly selected subjects yielded a correlation of plus 0.89 between subject self-reports and observer reports. Based upon an analysis of covariance between the pretreatment baseline and the posttreatment measures of smoking rate a significant difference between the groups and the repeated measures was demonstrated ( $p < 0.05$ ). With abstinence rate as the criterion variable, a difference statistically significant at the 0.05 level existed between groups and between male and female subjects. The  $T_2$  group demonstrated a significantly higher abstinence rate than either the  $T_1$  or NT groups. Females abstained at a significantly higher rate than did males. (Auth. Abs. Mod.)

**81-0611.** Ogden, R. G.; Lawrence, R. P. Apparatus for Reducing the Desire to Smoke. United States Patent No. 4,246,913, January 27, 1981, 4 pp.

A device is presented for use by a smoker in developing a subconscious aversion to smoking. The device includes a special pressure transducer that is coupled to a holder for a smoking article such as a cigarette, for sensing whenever smoke is drawn from the cigarette and for producing a corresponding electrical control signal. The device further includes a transformer for converting the control signal to an electrical shock signal having a substantially higher voltage level, a potentiometer for permitting a manual adjustment of the voltage of the shock signal to a prescribed level, and a pair of electrodes for coupling the shock signal to the skin of the smoker, whereby every time smoke is drawn from the cigarette, a small, but annoying, electrical shock is received by the smoker. (Auth. Abs.)

**81-0612.** Palmatier, J. R.; Bornstein, P. H. Effects of Subliminal Stimulation of Symbiotic Merging Fantasies on Behavioral Treatment of Smokers. *Journal of Nervous and Mental Disease* 168(12): 715-720, December 1980.

The subliminal psychodynamic activation method was used to enhance the efficacy of a behavior therapy approach (i.e., rapid smoking) to smoking cessation. A total of 34 subjects received a 3-week, group-oriented, multicomponent behavior therapy package aimed at smoking cessation. Subjects were randomly assigned to either experimental or control groups. The experimental group ( $n=18$ ) received the subliminal message "mommy and I are one," and the control group ( $n=16$ ) the message "people are walking." At 4-weeks posttreatment the abstinence rate for the experimentals was 67 percent and 12.5 percent for the controls. At 12-weeks followup, 44 percent of the experimentals and 12.5 percent of the controls were abstinent. Analysis revealed a statistically significant difference between groups at 4 ( $p < 0.01$ ) but not

12 weeks. A multiple analysis of covariance was used to analyze percentage of baseline smoking at both followup points. A significant main effect for treatment and for time emerged along with an interaction between treatment and time ( $p < 0.005$ ). Thus, the results revealed that the subliminally exposed message differentially affected the posttreatment smoking behavior of the experimental group. The results were interpreted as evidence for a transference phenomena explanation for the effectiveness of the behavioral treatment program. (Auth. Abs. Mod.)

**81-0613.** Pechacek, T. F. *An Evaluation of Cessation and Maintenance Strategies in the Modification of Smoking Behavior*. Doctoral Dissertation, University of Texas, Austin, University Microfilms International 77-23013, May 1977, 83 pp.

The purpose of this study was to test the efficacy of the Covert Aversive Smoking (CAS) procedure as a less stressful alternative to the Rapid Smoking (RS) procedures. The impact of supplementary self-control (SC) maintenance training was also evaluated relative to a nonspecific group discussion (IMS) condition. Subjects included 76 smokers (27 male, 49 female) who were assigned to the four treatment conditions. All treatments were provided in 8-12 member groups which met for 8 sessions over 4 weeks. All treatment conditions had three phases: cessation, transition (reinforcement of abstinence), and maintenance (encouragement of nonsmoking lifestyle development). Results indicated that CAS was not significantly less effective than RS, while the data on maintenance training was mixed and difficult to interpret.

**81-0614.** Peltier, B. N. *The Effects of Differential Recruitment Procedures, Reinforcement Methods, and Focused Smoking on the Cigarette Smoking Behavior of Adolescents: An Experimental Study*. Doctoral Dissertation, Wayne State University, Detroit, Michigan, University Microfilms International 80-10163, 1979, 178 pp.

The study was an experiment in two phases. Phase 1 was conducted to compare two approaches to attracting and recruiting adolescent smokers to an active, behavioral, smoking cessation program. Phase 2 was an experimental evaluation of focused smoking, a modified version of regular paced aversive smoking. In this phase a focused smoking plus reinforcement condition was compared to a reinforcement-only condition. The impact of previous exposure to a didactic smoking prevention program was investigated in terms of both recruitment (Phase 1) and cessation (Phase 2). The experiment was conducted at four high schools in northern California. Subjects were 53 high school students (mean age = 15.5 years) most of whom were female (77 percent), who volunteered to quit smoking. In Phase 1, light recruitment (normally used local publicity methods for 5 school days) produced only 1 volunteer, while heavy recruitment (consisting of light recruitment plus 4 additional days of intense,

person-to-person contact) produced 31 volunteers. Previous exposure to the didactic prevention program did not appear to have an effect. In Phase 2, five dependent measures were used to assess the outcome: (1) self-reported smoking frequency, (2) self-reported urge frequency, (3) self-reported social self-efficacy level, (4) self-reported social self-efficacy strength, and (5) physiological measurement of respiratory carbon monoxide (ppm in exhaled breath). Again, exposure to the didactic prevention program did not seem to have an effect. Focused smoking plus reinforcement seemed to be superior to reinforcement alone. Significant differences were found most often in the urge frequency data. Significant correlations were found between urges and cigarettes/day (total sample,  $p < 0.001$ ) and between urges and efficacy level (total sample,  $p = 0.014$ ). Correlations between objective measurement of carbon monoxide and self-reported smoking frequency were consistently low, except for subjects who reported complete abstinence. Of the 53 subjects who attended the first session, 17 completed all sessions and 8 had quit smoking at the end of treatment. Of those 8, only 2 were still not smoking at an unannounced 10-week followup. In terms of recruitment, results indicated that extra person-to-person, intensive procedures are necessary to attract adolescents to a smoking cessation program in high schools. In terms of cessation, results added support to a model of treatment which is multivariate and intensively active in the short term, and contains a strong long-term maintenance component. (Auth. Abs. Mod.)

**81-0615.** Powell, D. H. *Helping Habitual Smokers Using Flooding and Hypnotic Desensitization Technique: A Brief Communication*. *International Journal of Clinical and Experimental Hypnosis* 28(3): 192-196, July 1980.

Twenty-three individuals were seen initially for hypnotic treatment to stop smoking. Of these 23, there were 7 recidivists who were subsequently treated with a flooding and hypnotic desensitization technique. The seven included three males and four females aged 28-36 years, who had smoked 1-3 packs/day for at least a decade. The flooding and hypnotic desensitization technique proceeded as follows: (1) each person was asked to bring a cigarette to the session; (2) each was asked to intensify the drive for a cigarette up to smelling it, putting it into the mouth, and lighting the lighter but not the cigarette; and (3) each was then instructed to throw away the cigarette and use the self-imposed hypnotic experience to eliminate the drive. No more than two trials were needed to extinguish the desire for a cigarette at 6-9 months followup.

**81-0616.** Strand, R. A. *Social Commitment and Goal Setting in Smoking Control*. Master's Thesis, Michigan State University, University Microfilms International 13-13447, 1979, 52 pp.

This study tested the effect of a behavioral commitment to quit smoking on actual cigarette consumption. Behavioral commitments were made in two ways. First, some subjects

were directed to make a social commitment to their close acquaintances of their intention to quit smoking. The second behavioral commitment consisted of having subjects make smaller and smaller daily goals with respect to cigarette consumption. It was expected that both forms of behavioral commitment would produce dissonance. A marginally statistically significant ( $p < 0.10$ ) three-way interaction indicated that social commitment resulted in a slower recidivism rate.

Also, a statistically significant correlation was obtained between percent of total friends positive about the effort to quit and 3-month followup percent of baseline rate ( $p < 0.05$ ). Explanations of the effects of the commitment treatments are based on social support. Recommendations are made for further field testing of social commitment to quit cigarette smoking and the social support variable. (Auth. Abs. Mod.)

## TOBACCO PRODUCT ADDITIVES

**81-0617.** Borowski, H. **Filter for Cigarettes, Cigarillos or Pipes.** United States Patent No. 4,194,517, March 25, 1980, 3 pp.

An improved fibrous filter which is useful for removing harmful chemicals from cigarette, cigarillo, or pipe tobacco smoke is disclosed. This filter is characterized as containing aqueous phosphoric acid esters and/or naphthalene sulfonic acids which are water-insoluble in the amount of 2 to 4 percent by total filter weight. The nicotine absorption difference of this filter as compared to prior citric acid diethyl ester-containing filters was found to be roughly double (15.8 vs. 8.7).

**81-0618.** Bryant, H. G., Jr.; Norman, V. **Tobacco Composition.** United States Patent No. 4,248,251, February 3, 1981, 8 pp.

The concentration of the polycyclic aromatic hydrocarbons (PCHAH) fraction normally found in the smoke of a natural leaf smoking tobacco can be substantially reduced without adverse organoleptic effects on tobacco smoke by incorporating both palladium, in metallic or salt form, and an inorganic salt of nitric or nitrous acid. The amount of added inorganic nitrate or nitrite salt required to decrease the PCHAH levels in tobacco smoke can be lowered by the use of tobaccos containing a high concentration of native nitrate nitrogen. When both nitrate and palladium were added to tobacco, the PCHAH content in the smoke was 50 percent of that of the untreated tobacco. Palladium alone and nitrate alone resulted in PCHAH concentrations of 60 and 78 percent, respectively.

**81-0619.** Cohn, C. C. **Treatment of Cigarette Paper.** United States Patent No. 4,187,862, February 12, 1980, 7 pp.

A cigarette paper treatment process is described which would improve fire safety by better ash retention and minimize the unpleasant effects of cigarette smoke to non-smokers by reducing the smoke to negligible quantities between puffs. The cigarette paper is treated by one of two alternative processes. The first alternative process is characterized by the step of coating between 40 and 100 percent of

the surface area of the paper with an aqueous alkali metal silicate solution (e.g., sodium oxide and silica ( $\text{SiO}_2$ )), the  $\text{SiO}_2$  concentration of which ranges from between 12 and 16 percent for 40 percent coverage, to between 7 and 15 percent for full coverage. The second alternative process is characterized by two sequential uniform coatings of an aqueous alkali metal silicate solution, the  $\text{SiO}_2$  concentrations in each solution ranging from 1.7 to 6 percent. (Auth. Abs. Mod.)

**81-0620.** de la Burde, R. Z.; Aument, P. E. **Method for Uniform Incorporation of Additives Into Tobacco.** United States Patent No. 4,243,056, January 6, 1981, 6 pp.

This invention relates to a method for uniformly incorporating an additive (particularly flavoring agents) into tobacco. The method comprises (1) dispersing the additive in liquid carbon dioxide ( $\text{CO}_2$ ), (2) contacting tobacco with the resultant liquid  $\text{CO}_2$  solution, (3) converting liquid  $\text{CO}_2$  absorbed during step (2) to solid  $\text{CO}_2$ , and (4) allowing the solid  $\text{CO}_2$  to evaporate. Expansion of the tobacco is simultaneously accomplished when the solid  $\text{CO}_2$  is rapidly vaporized. Tobacco thus impregnated with benzaldehyde, menthol, and methyl salicylate as flavoring agents resulted in cigarettes which had the flavor of cherry, menthol, and wintergreen, respectively.

**81-0621.** Demole, E. P. **Cycloaliphatic Oxygenated Derivative as Flavoring Ingredient in Tobacco Products.** United States Patent No. 4,197,862, April 15, 1980, 3 pp.

The present invention provides a process for the aromatization of foodstuffs, feedstuffs, beverages, pharmaceutical preparations, and tobacco products or tobacco substitutes by adding a small amount (1-100 ppm by weight) of 2,6,6-trimethyl-3-oxo-cyclohex-1-en-carbaldehyde. When tobacco sprayed with the carbaldehyde was used for the manufacture of test cigarettes, the smoke of these cigarettes presented a more marked straw-like character than the smoke of control cigarettes.

**81-0622.** Gambardello, J.A.A. **Smokeless Cigarettes.** *Omni* 1(8): 37, May 1979.

Unpuffed cigarettes account for about 95 percent of the smoke that reaches the lungs of both smokers and nonsmokers. A patented product called Colite (a sodium silicate that is 50 percent water) is described which, when brushed on a cigarette, prevents the tobacco from burning unless the cigarette is puffed. Government tests conducted in 1973 showed that cigarettes treated with Colite emit 60 percent less tar and 43 percent less nicotine than untreated cigarettes.

**81-0623.** Light, K. K.; Sanders, J. M.; Vock, M. H.; Shuster, E. J.; Vinals, J. F.; Schreiber, W. L.; Hall, J. B.; Hruza, D. E., Sr.; Kamath, V.; Mookherjee, B. D.; Tseng, C. Y.; Sprecker, M. A. **Hydroxy Alkenyl Norbornane Derivatives.** United States Patent No. 4,153,811, May 8, 1979, 79 pp.

Hydroxy alkenyl norbornane derivatives are described for use in augmenting or enhancing the organoleptic properties of foodstuffs, chewing gums, toothpastes, medicinal products, tobacco products, perfumes, and perfumed articles. One hydroxy alkenyl norbornane derivative, alpha-ethyl-3,3-dimethyl-2-norbornanemethanol, was used as a cellulose acetate filter additive at a concentration of 1,000 ppm. When attached to a commercial cigarette this filter resulted in sweet, woody, piney aromas on smoking, and in a pleasant, cooling effect and reduced harshness as compared to a cigarette with a nonadditive-containing filter. (Auth. Abs. Mod.)

**81-0624.** Light, K. K.; Spencer, B. M.; Vinals, J. F.; Kiwala, J.; Vock, M. H.; Shuster, E. J. **4-Butyl-3,4,5-trimethylcyclohexa-2,5-dienone.** United States Patent No. 4,154,763, May 15, 1979, 21 pp.

Methods for processing several cyclohexadiene derivatives, as well as their uses in foodstuff, chewing gum, toothpaste, medicine, tobacco, and perfume, are described. Experimental cigarettes composed of Bright, Burley, Maryland, and Turkish tobaccos, 0.1 percent of a flavor formulation, and 100 ppm of either 4-butyl-3,4,5-trimethylcyclohexa-2,5-dienone or 2,4,4,6-tetramethylcyclohexa-2,5-diene-1-one resulted in pungent, spicy, black pepper-like, and sweet nuances in the aroma and taste, on smoking.

**81-0625.** Mookherjee, B. D.; Trenkle, R. W.; Wilson, R. A.; Schmitt, F. L.; Vock, M. H.; Granda, E. J.; Vinals, J. F.; Kiwala, J.; Schreiber, W. L. **Composition of Matter Comprising More Than 50 Percent Trans, Trans-Δ-Damascone for Augmenting or Enhancing the Aroma and Taste of a Smoking Tobacco.** United States Patent No. 4,211,242, July 8, 1980, 22 pp.

The addition of a composition comprised of >50 percent *trans*, *trans*-Δ-damascone and <50 percent *cis*, *trans*-Δ-damascone to tobacco can be used to augment the aroma and

taste to the smoke. For instance, when added to a tobacco flavor formulation in the amount of either 500 or 1,000 ppm and applied at the rate of 1.0 percent to blended tobacco cigarettes containing Bright, Burley, Maryland, and Turkish varieties, the smoke flavor had more body and floral, musty, hay-tea-like, sweet, and fruity nuances than did untreated cigarettes.

**81-0626.** Mookherjee, B. D.; Trenkle, R. W.; Wilson, R. A.; Schmitt, F. L.; Vock, M. H.; Granda, E. J.; Vinals, J. F.; Kiwala, J.; Schreiber, W. L. **Use of Trans, Trans-Δ-Damascone and Mixtures Containing 80 Percent of Trans, Trans-Δ-Damascone in Augmenting or Enhancing the Aroma of a Detergent.** United States Patent No. 4,198,309, April 15, 1980, 19 pp.

A process for augmenting or enhancing the aroma of a nonionic, anionic, or cationic solid or liquid detergent is described. It consists of the addition of 80 to approximately 98 percent of *trans*, *trans*-Δ-damascone and from about 2 to about 20 percent of *cis* *trans*-Δ-damascone or substantially pure *trans*, *trans*-Δ-damascone to the detergent. The compound *trans*, *trans*-Δ-damascone, as well as mixtures of *trans*, *trans*-Δ-damascone with <50 percent *cis*, *trans*-Δ-damascone, are also useful in augmenting or enhancing berry, wine, tea, and juice flavors. In tobacco or tobacco substitute compositions, addition of 500 or 1,000 ppm of the *trans*, *trans* and *cis*, *trans* mixture imparts floral, musty, hay-tea-like, and sweet-fruity notes prior to and on smoking.

**81-0627.** Mookherjee, B. D.; Wilson, R. A.; Schmitt, F. L.; Vinals, J. F.; Kiwala, J. **1-(2,6,6-Trimethyl-1,3-cyclohexadien-1-yl)-1,3-butanedione and Organoleptic Uses Thereof.** United States Patent No. 4,157,351, June 5, 1979, 19 pp.

This invention involves the use of 1-(2,6,6-trimethyl-1,3-cyclohexadien-1-yl)-1,3-butanedione to augment, alter, modify, or enhance the flavor and/or aroma of consumable materials, such as tobacco. Experimental cigarettes to which the compound was applied were found to have improved body, enhanced tobacco character, to be sweeter, and to have more pronounced hay/tea character in the mainstream than control cigarettes. In the sidestream smoke, the experimental cigarettes were found to be sweeter, more tobacco-like, and to have a "fresh cigarette pack" aroma.

**81-0628.** Norman, V.; Bryant, H. G., Jr. **Tobacco Composition.** United States Patent No. 4,216,784, August 12, 1980, 8 pp.

The amount of polycyclic aromatic hydrocarbons (PAH) in tobacco smoke is reduced and a substantially diminished biological activity of the tobacco smoke condensate (as determined by skin painting of albino mice) is achieved by the addition of palladium (from 0.001 to 1 percent by weight), either in metallic or salt form, and an inorganic nitric oxide

generating compound (from 0.25 to 0.75 percent by weight) to tobacco. For instance, a tobacco blend containing 0.06 percent by weight of palladium resulted in a smoke PAH concentration range of 52-68 percent of that of the untreated tobacco.

**81-0629.** Rowsell, D. G.; Hems, R. *Cyclic Substituted Ureas Having a Physiological Cooling Effect*. United States Patent No. 4,137,304, January 30, 1979, 14 pp.

Cyclic and acyclic amides, substituted ureas, and sulpho-namides are described as having a pronounced physiological cooling activity, without the strong, minty smell of menthol. Their use for this purpose in a variety of edible and topical preparations such as foodstuffs, cosmetics, chewing gum, and tobacco products such as cigarette tobacco, cigarette filter tip, pipe tobacco, cigars, chewing tobacco, and snuff is described. In one example, an experimental cigarette tobacco was sprayed with *N*-(2,4,4-trimethylpent-2-yl)propionamide solution and rolled into cigarettes containing approximately 0.5 mg of this active compound. Smoking the impregnated cigarette resulted in a cooling effect in the mouth characteristic of mentholated cigarettes.

**81-0630.** Rowsell, D. G.; Spring, D. J.; Hems, R. *Acyclic Carboxamides Having a Physiological Cooling Effect*. United States Patent No. 4,153,679, May 8, 1979, 9 pp.

Acyclic carboxamide compounds having a physiological cooling effect similar to that of menthol, but without the strong minty odor are described. The compounds may be incorporated into (1) edible or potable compositions such as alcoholic beverages, chewing gum, or jelly; (2) toiletries; (3) medicaments; (4) tobacco preparations such as cigars, cigarettes, pipe tobacco, chewing tobacco and snuff, filters, and filter tips; and (5) water-soluble adhesive compositions. In filter material as little as 0.1 mg of the coolant is effective. The same effect required 0.25 g of active ingredient in cigarette tobacco.

**81-0631.** Trenkle, R. W.; Mookherjee, B. D.; Kasper, R.; Vock, M. H.; Vinals, J. F.; Kiwala, J.; Schmitt, F. L. *Use in Smoking Tobacco Compositions and Smoking Tobacco Articles of 1-Acyl-2,6,6-Trimethylcyclohexene Derivatives*. United States Patent No. 4,215,704, August 5, 1980, 31 pp.

A process is described for augmenting or enhancing the aroma or taste of smoking tobacco. A composition consisting essentially of an organoleptic-modifying quantity (e.g., 500-1,000 ppm) of at least one 1-acetyl-2,6,6-trimethylcyclohexene (e.g., alpha- and beta-damascone) is added in order to impart musty-floral, slightly sweet, fruity, damascenone notes prior to smoking and sweet, Virginia tobacco-like notes on smoking.

**81-0632.** Vinals, J. F.; Kiwala, J.; Wilson, R. A.; Mookherjee, B. D. *5-Isopropyl-3-nonene-2,8-dione as Flavorant and as a Flavor Enhancer in Conjunction With Smoking Tobacco and Smoking Tobacco Articles*. United States Patent No. 4,210,158, July 1, 1980, 7 pp.

The use of *cis* and/or *trans* isomers of 5-isopropyl-3-nonene-2,8-dione as flavorants or as flavor enhancers in tobacco or tobacco substitutes is described. An experimental cigarette composed of a mixture of Bright, Burley, Maryland, and Turkish tobaccos, 0.1 percent of a flavor formulation, and 500 or 2,000 ppm of 5-isopropyl-3-nonene-2,8-dione was found to result in solanone-like, hay-like, and Burley tobacco-like flavor nuances prior to smoking, and a fuller body and flavor sensation in addition to enhanced Burley tobacco-like and cocoa-like taste nuances on smoking.

**81-0633.** Watson, H. R.; Rowsell, D. G.; Spring, D. J. *N-Substituted Paramenthane Carboxamides*. United States Patent No. 4,178,459, December 11, 1979, 6 pp.

This invention relates to a group of 3-substituted-*p*-menthanes which have a pronounced physiological cooling activity, little or no odor, relatively low volatility, and are substantially nontoxic. These compounds can be incorporated into tobacco and associated articles, e.g., pipe and cigarette filters, especially filter tips for cigarettes.

**81-0634.** Willis, B. J.; Fischetti, F., Jr.; Eilerman, R. G. *Flavoring Compositions Containing Dialkyl- $\alpha,\beta$ -Diacyl Succinates*. United States Patent No. 4,200,659, April 29, 1980, 4 pp.

The flavor compositions of this invention include certain dialkyl- $\alpha,\beta$ -diacyl succinates which significantly enhance the flavor component or components of flavor compositions. When added to smoking tobacco or synthetic tobacco (by spraying a 1 percent ethanol solution at a rate of 4 ounces of solution/100 lbs tobacco, and allowing the alcohol to evaporate), the resulting product is increased in sweetness, the taste of the smoke is softened, and the flow of saliva is increased, which lessens dryness of the mouth during smoking. (Auth. Abs. Mod.)

**81-0635.** Wilson, R. A.; Mookherjee, B. D.; Taylor, W. I. *Process for Preparing 1-(2,6,6-Trimethyl-1,3-Cyclohexadien-1-yl)-1,3-Butanedione and Intermediates*. United States Patent No. 4,157,350, June 5, 1979, 19 pp.

A process for preparing an equilibrium mixture containing 1-(2,6,6-trimethyl-1,3-cyclohexadien-1-yl)-1,3-butanedione and its enol is described. Uses of this mixture to augment, alter, modify, enhance, or impart flavor and/or aroma to consumable materials (e.g., detergent, perfume, and tobacco compositions) are given. In one tobacco product composition, for instance, an experimental tobacco blend containing

Bright, Burley, Maryland, and Turkish tobacco was formulated into cigarettes. These cigarettes were then treated with either 50 or 150 ppm of 1-(2,6,6-trimethyl-1,3-cyclohexadien-1-yl)-1,3-butanedione. Before smoking, the treated cigarette tobacco had sweet, fruity, berry-like, fresh-squeezed fruit (apple and grape) juice-like, hay-like, and tea-like aroma characteristics. On smoking, the experimental cigarette smoke had enhanced body and character and was sweeter with hay/tea notes as compared to untreated cigarettes.

**81-0636.** Withycombe, D. A.; Mookherjee, B. D.; Vock, M. H.; Vinals, J. F. *Isobutyl Substituted Heterocyclic Compounds and Uses for Augmenting or Enhancing the Organoleptic Properties of Smoking Compositions.* United States Patent No. 4,170,236, October 9, 1979, 18 pp.

The use of 2,4,6-triisobutyl-1,3,5-trioxane for aroma and taste enhancement of consumable materials and tobacco products is presented. Experimental cigarettes prepared from Bright, Burley, Maryland, and Turkish tobaccos were treated with a flavor formulation. Half the cigarettes were then treated with 500 or 1,000 ppm of 2,4,6-triisobutyl-1,3,5-trioxane, the others were used as controls. Prior to smoking, the experimental cigarettes had chocolate-like, cocoa-like, and

sweet-creamy notes, and upon smoking a chocolate- and tobacco-like aroma. Isobutyl-substituted heterocyclic compounds may also be added to tobacco substitutes, filters, or wrappers.

**81-0637.** Yoshida, T.; Vock, M. H. *Cyclic Acetals of 2-Methyl-2-Pentenal and Food Flavor Uses Thereof.* United States Patent No. 4,198,393, April 15, 1980, 7 pp.

Addition of one or more cyclic acetals of 2-methyl-2-pentenal to foodstuffs, chewing gums, toothpastes, or medicinal products produces sweet, fruity, gooseberry, green, aniseed, licorice, floral, and herbal aroma characteristics with spearmint-like and albedo-like flavor nuances. The cyclic acetals are also used to augment the flavor of chewing tobacco. For instance, a casing containing 2-(1-methyl-1-butenyl)-4-methyl-1,3-dioxolane, corn syrup, licorice, glycerine, fig juice, and prune juice, sprayed at a rate of 30 percent onto 100 lbs of chewing tobacco (85 percent Wisconsin leaf and 15 percent Pennsylvania leaf) was dried to a 20 percent moisture content. On chewing, the tobacco mixture had a consistent, long-lasting (20 min) licorice nuance in conjunction with the main fruity tobacco note.

See also, 81-0349

## TOBACCO MANUFACTURING AND PROCESSING

**81-0638.** Akaki, T.; Watanabe, R.; Ono, K.; Okubo, A.; Fukuzumi, T. *Firutaa Tabako no Hinshitsu ni Oyobosu Makigami to Chippu no Kalko Koka (dai Roppo) Kokitsumi Hyoka Narabini Sonota Tokuseichi Tono Sogo Kankai ni Tsuite.* [Effect of Degree of Perforation of Cigarette Paper and Tipping Paper on the Performance of Filter Cigarettes. (VI) Sensory Evaluation and Its Correlation With Other Characteristics.] *Scientific Papers of the Central Research Institute, Japan Tobacco and Salt Public Corporation* 120: 69-77, 1978, Japanese.

Sensory evaluation was carried out on 17 of 30 cigarette samples which were made by the combination of 6 kinds of perforated tipping papers and 5 kinds of cigarette papers. The correlation between sensory evaluation and chemical or physical characteristics of samples was examined. Increase in the degree of ventilation through cigarette paper or tipping paper caused a weakening of aroma and taste, difficulty in puffing, and lack of smoking satisfaction. Smoking characteristics such as strength of aroma and taste, easiness in puffing and smoking satisfaction were positively correlated with pressure drop value, total particulate matter, tar, nicotine in smoke and some gas constituents, and were negatively

correlated with the degree of ventilation through cigarette paper and tipping paper.

**81-0639.** Aversano, B.; Abet, M. *Demolizione Enzimatica Delle Pectine del Tabacco per Ridurre i Catrami.* [Enzymatic Degradation of Tobacco Pectin Substances for Tar Reduction.] *Istituto Sperimentale per il Tabacco Annali* 5: 65-70, 1978, Italian.

Tobacco pectins contribute to tar production in smoke, especially to volatile phenolic compounds. Enzymatic degradation has been tried to obtain a vegetable material with lower content in these macromolecules because they are more combustible when hydrolyzed into simple molecules. Burley tobacco leaves, freeze-dried after harvesting and after air-curing, were homogenized and mixed with 10 percent and 20 percent pectinase raw extract by fungi: with fermentation taking place from 72 to 144 hrs at 35°C. Pectins, after dissolution as ammonium pectate and precipitation in ethanol, were determined colorimetrically. Pectin content after harvesting and air-curing the leaves was 11.2 percent, but after adding 10 percent and 20 percent of pectinase powder after 72 hrs of enzymatic digestion the pectins in air-cured



leaves were 7.9 and 4.7 percent, respectively, and in fresh leaves 6.5 and 4.6 percent. After 144 hrs the pectins in cured leaves were 7.5 and 3.4 percent and in fresh leaves 7.0 and 3.9 percent. Some chemical characteristics are improved: reducing sugars increased from 0.6 to 5.6 percent in fresh leaves and from 0.7 to 5.3 percent in cured leaves. There was also a reduction of total alkaloids and total nitrogen, and protein nitrogen was slightly increased. (Auth. Abs. Mod.)

**81-0640.** Clayton, B.; Thurman, B. H. *Tobacco Smoke Filter*. United States Patent No. 4,197,863, April 15, 1980, 8 pp.

A filter for removing nicotine and tars from tobacco smoke without unduly increasing the draw has a filter rod composed of cotton fibers. At the end of the filter rod is placed a wood cellulose fiber disc, which further purifies the smoke before it enters the smoker's mouth. This disc can also be substituted with pure bleached cotton fibers

**81-0641.** Gopalam, A.; Rama Mohan Rao, I. B.; Gopalachari, N. C. *Correlation Studies on the Hydrolysing Activity of  $\alpha$ -Amylase on Starch During Flue-Curing of Tobacco*. *Tobacco Research* 6(1): 12-15, June 1980.

A simple linear correlation between  $\alpha$ -amylase activity and starch during curing has been established by superimposing varieties and stalk positions and by retaining their individuality. In the Kanakaprabha variety the correlations are highly significant ( $p < 0.01$ ) for the bottom and middle stalk positions, but no relationship could be found in the top primings. In CTRI special  $\alpha$ -amylase and percentage of starch are not significantly correlated. (Auth. Abs. Mod.)

**81-0642.** Green, K. P.; Inglis, B. R.; Allen, R. A.; Tringham, R. W. *Moulded Fibrous Material*. United States Patent No. 4,149,550, April 17, 1979, 6 pp.

This patent presents a cigarette filter composed of elongated fibrous structures as a core and enclosed by a fibrous, dense crust. In comparison with filters currently used, this filter has enhanced filtration efficiency, is harder, is less susceptible to uneven staining which results in an unattractive appearance, and can be handled more easily for high speed manufacturing. The filter is preferably formed from a mixture of stiff bulky fibers (e.g., alpha cellulose chemically bleached pulps containing a high proportion of summerwood) in combination with finer fibers for improved filtration. For the fine fibers, it is preferred to include in the region of 40 to 50 percent of fibers having a high specific surface area. Examples of such fibers are esparto, eucalyptus, and cotton. It has also been found that it may be advantageous to remove certain fractions of the fibers in order to obtain an optimum balance of functional properties in the product. As regards loading, it has been found that the addition of up to 10 percent kaolin or calcium carbonate gives an improvement in filtration efficiency. Other mineral filters, such as diatomaceous earth, may

also be used to improve the filtration of vapor phase components. Activated carbon can also be included. It is also possible to include a proportion of any other suitable fibrous material, for example synthetic fibers such as polyolefins. Although the fibrous elements described above are for use as filters for smoking products, the material has other uses, such as filters for other materials such as oil, and it can be used as an absorbent element.

**81-0643.** Horsewell, H. G.; Green, J. D.; Luke, J. A.; Candlish, S. M. *Tobacco-Smoke Filters*. United States Patent No. 4,219,033, August 26, 1980, 8 pp.

A tobacco smoke filter comprises a plug of filter material of which a transverse cross section is impervious to the passage of smoke except for a minor proportion of the cross section area which forms a smoke-accelerating orifice. The plug is enclosed by an envelope permitting ingress of air into a region of the plug downstream of the orifice. The cross section may be impervious because of the presence of a barrier diaphragm of impervious material. Thus, an annular groove may be provided in the plug at the cross section and may be filled with, or have its walls coated with, an impervious material. Alternatively the cross section may be impervious by reason of the closure of interstices in the filter material by the local application of heat. When the filter described in this patent was compared with the conventional filter for total particulate matter (TPM) delivery as compared to puff number, this filter was found to have a higher filtration efficiency and a sustained lower delivery of TPM. (Auth. Abs. Mod.)

**81-0644.** Kaye, P. *Cigarette Holder With Filter*. United States Patent No. 4,201,232, May 6, 1980, 4 pp.

A cigarette holder and filter cartridge combination which define a filter cartridge chamber and a filter cartridge are described. The filter is comprised of a core of mixed absorbent and nonabsorbent fibers and a cylindrical expandable paper wrapper, which when wet expands to fill the entire diameter of the filter cartridge chamber, thereby insuring that no smoke can reach the smoker by passing around the edges of the filter. (Auth. Abs. Mod.)

**81-0645.** Keith, C. H. *Smoking Material*. United States Patent No. 4,197,861, April 15, 1980, 4 pp.

An improved synthetic material adapted for use in smoking products is prepared by intimately mixing a suitable matrix material such as carboxymethyl cellulose, hydroxyethyl cellulose, carboxymethyl hydroxyethyl cellulose, methyl cellulose, and carboxymethylated starch, with a combustion modifier such as titanium dioxide, silica gel, and calcium carbonate, and a minor amount of an alkali metal or alkaline earth metal salt of an organic acid (e.g., potassium, lithium, and magnesium salts of acetic, formic, malic, or citric acids).

**81-0646.** Larson, T. M.; Moring, T. B.; Ireland, M. S. **Nicotine Transfer Process.** United States Patent No. 4,215,706, August 5, 1980, 5 pp.

A nicotine transfer process is described in which a donor tobacco is contacted with a receiving substrate (e.g., tobacco filler materials or reconstituted leaf) which has been treated with a strong acid (e.g., phosphoric, sulfuric, nitric, hydrochloric acid,  $pK_a \leq 3.5$ ) or an ammonium salt of a strong acid. Part of the nicotine in the donor tobacco is transferred to the receiving substrate. Thereafter the donor tobacco and the substrate may be separated. The donor tobacco has a reduced nicotine content and is therefore more desirable for use in a smoking product. When the receiving substrate is a low-nicotine tobacco byproduct (or artificial smoking material), enriched in nicotine as a result of the transfer, it may be used as a filler material for smoking products. In one of the experimental examples, treated reconstituted tobacco leaf substrate, when exposed to donor tobacco for 2 hrs at 95°C, increased in nicotine content from 0.6 to 3.05 percent, while the nicotine content of the donor was reduced by approximately 50 percent.

**81-0647.** Lendvay, A. T.; Spann, B. M. **Continuous Process for Expanding Tobacco.** United States Patent No. 4,248,252, February 3, 1981, 6 pp.

A continuous process of expanding tobacco with carbon dioxide and ammonia is disclosed. It comprises contacting tobacco with concentrated ammonium hydroxide, mixing the ammonium hydroxide-treated tobacco with ground solid carbon dioxide, thereafter expanding the tobacco by means of heat and equilibrating the expanded tobacco until equilibrium moisture content is attained. Concentrated aqueous solutions of ammonium carbamate may be substituted for the ammonium hydroxide and solid carbon dioxide in the process. The tobacco may be expanded in an atmosphere of hot steam or gas, or by means of microwave or radiant heat energy. The process allows impregnation and expansion of tobacco to be effected without interruption on a production line. (Auth. Abs.)

**81-0648.** Neukomm, S. **Filter for Smoking Article, Mainly Cigarette.** United States Patent No. 4,201,234, May 6, 1980, 5 pp.

The invention is related to a new and improved filter for smoking articles, especially cigarettes, of the cavity type. In order to achieve better filtration, the cavity is filled by two cylindrical filter portions made of fibrous material. The filter contains a particulate filtering matter being composed of two physical fractions of particles, the mean diameter of the particles of the first fraction being 20-50 times the mean diameter of the particles of the second fraction. Preferably, the particles of the first fraction have a mean diameter comprised between 0.6 and 1.0 mm, and the particles of the second fraction have a mean diameter comprised between

0.010 and 0.030 mm. It is preferred that the volume ratio of the first to the second fraction is at least 2:1 and may amount until 50:1. The particles may consist of a variety of substances including alumina, cellulose, corn flour, nylon, and polystyrene. In one experiment, the filters from 400 Swiss cigarettes were removed, another 400 cigarettes were attached to filters presently available, and another 400 were attached to the filter of this invention containing activated carbon (mean diameter 0.5 mm), and agar agar powder (mean diameter 0.025 mm), with a 5:1 volume/volume ratio. The tar condensate (mg/cigarette) after smoking was as follows: cigarettes without filter, 22.9; cigarettes with available filters, 15.7; and cigarettes with invention filters, 11.7. (Auth. Abs. Mod.)

**81-0649.** Perini, F.; Bell, J. H.; Smart, D. **Behavior of Seedleaf Tobaccos in a Laboratory Fermentation Chamber.** *Beitraege zur Tabakforschung International* 10(3): 185-189, October 1980.

A laboratory system which simulates factory fermentation of tobaccos has been designed and made operational. This system is of broader scope and versatility than the known laboratory tobacco fermenters. The device consists of a humidified polycarbonate chamber containing a rotating aluminum wheel bearing eight polypropylene vessels. Heating, humidification, and aeration are controlled. Routine fermentation conditions are 45°C and 90 percent relative humidity for 4 days. Seedleaf tobaccos from 1973 to 1977 have been fermented in this chamber. Extent of fermentation was determined by decreases in the percentages of total nitrogen, total volatile bases, and nicotine, and by an increase in pH of the dried tobacco. (Auth. Abs.)

**81-0650.** Scheviak, L. A.; Sheets, T. J.; Nelson, L. A. **Effects of Two Curing Methods on Residues of Monocrotophos, Acephate, Methomyl, and MH on Flue-Cured Tobacco.** *Tobacco International* 182(24): 57-61, November 28, 1980.

Both conventional and bulk curing reduced residues of monocrotophos, acephate, and methomyl on flue-cured tobacco. Residues of monocrotophos averaged 0.32 ppm after conventional curing and 0.28 ppm after bulk curing. Based on monocrotophos residues on green tobacco, both methods of curing reduced residues 99.8 percent. Total acephate (acephate plus methamidophos) residues on conventionally cured tobacco averaged 0.53 ppm (99.6 percent loss during curing) and 0.46 ppm on bulk-cured tobacco (99.8 percent loss). Methomyl-treated tobacco had an average residue of 4.00 ppm after conventional curing and 3.19 ppm after bulk curing, for losses of 94.0 and 95.2 percent during curing, respectively. Losses due to curing were not determined on tobacco treated with maleic hydrazide (MH), but MH residues of 77 ppm were found on both conventionally and bulk-cured tobacco. (Auth. Abs.)

**81-0651.** Zlatev, G.; Parshikova, A.; Draganova, D. *Fraktsionen Sustav na Tiutlunevite Otpadutsi i Metodi za Pochistvaneto im ot Mineralen Prakh.* [Fractional Composition of Tobacco Waste Material and Methods for Cleaning It From Mineral Dust.] *Bulgarski Tiutlun* 25(2): 30-38, 1980, Bulgarian.

Results are presented of laboratory tests of three methods of tobacco recovery from industrial tobacco processing and cigarette manufacturing wastes. The waste material consists of a mixture of tobacco dust and mineral dust (sand). The purpose of the tests was to separate tobacco from sand to

obtain a product with a maximum 10 percent of sand. The results show that a screening method using a series of 0.125 to 0.8 mm sieves permits a 50 percent by weight recovery of initial waste material. Analogous recovery is feasible by air flow at an appropriate rate through a microcyclon, if a waste material fraction of over 0.2 mm particle size is used. The third method of separation, washing with water, makes it possible to recover 15-40 percent of organic waste material. A combination of the three methods may achieve a 60-65 percent recovery of the initial waste material.

*See also, 81-0617*

## TOBACCO ECONOMICS

**81-0652.** Caspers, G.; Dittrich, G. *New Tobacco Tax Law in the Federal Republic of Germany.* *Tabak-Journal International* (3): 231-233, 1980.

The West German tobacco tax law has been altered to conform to the December 18, 1978, guidelines of the European Economic Council. The reduction of the tobacco tax for cigars by 24.7 percent and for cigarillos by 8.5 percent has taken into account the fact that sales of cigars in the Federal Republic of Germany have been dropping continuously for 20 years. The tobacco tax structure for cigarettes has been altered in such a way that the quantity-specific portion now amounts to 40 percent instead of the previous 50 percent. (Auth. Abs.)

**81-0653.** Connor, J. M. *The U.S. Food and Tobacco Manufacturing Industries: Market Structure, Structural Change, and Economic Performance.* U.S. Department of Agriculture, Agricultural Economic Report No. 451, March 1980, 120 pp.

four-fifths of all media advertising, and over 96 percent of all research and development. (Auth. Abs. Mod.)

**81-0654.** Doron, G. *How Smoking Increased When TV Advertising of Cigarettes Was Banned.* *Regulation* 3(2): 49-52, March-April 1979.

The role of cigarette advertising and its contribution to market expansion of tobacco products as well as the effect of the broadcast media advertising ban on the tobacco industry's market size is discussed. The prohibition act of 1970 in Congress had an adverse effect: cigarette sales increased at an average annual 2.5 percent in the 5 years following the ban with the greatest increase of 4.4 percent in 1973. The tobacco industry's savings from the advertising ban were used for general diversification. The ban not only allowed six major U.S. firms to have a lasting control over the market, but allowed reduced cigarette production costs, particularly the "safer" cigarettes containing less tobacco. The smoker consumes more of the latter in order to receive the same nicotine payoff. Further, the prohibition act failed to cut down on the number of adolescents starting to smoke.

**81-0655.** Lu, S. Y. *Taiwan Tobacco: Leaf Imports on the Upswing.* *Tobacco Reporter* 107(12): 38-39, December 1980.

A general discussion of tobacco production in Taiwan under the monopoly system administered by the Taiwan Tobacco and Wine Monopoly Bureau is presented. Tobacco prices and the grading system are described, and the sites and capacities of the nation's tobacco redrying and cigarette factories discussed. Domestic consumption of tobacco products in Taiwan has steadily increased, e.g., in 1949, the value of total sales was 26,287,900 NT dollars; in 1978, the value was 16,876,644,870 NT dollars. In 1977, the average Taiwan smoker consumed 27.3 packs of cigarettes per month. The

Tobacco Monopoly imports more than 10,000 metric tons of U.S. tobacco per year; most of it is reported to be high quality and expensive. A 10 percent annual increase in imports is expected for the future.

**81-0656.** Mann, C. K. *Tobacco: The Ants and the Elephants*. Salt Lake City, Utah, Olympus Publishing Company, 1975, 175 pp.

The tobacco industry in the United States is undergoing major changes due to (1) increased mechanization, (2) changes in the Government tobacco allotment system, and (3) the association of tobacco with health problems. Serious economic hardship, particularly for farm workers and tenants, is foreseen unless effective policy countermeasures are taken. A concentration of tobacco production in the most efficient production areas is likely, leaving some traditional areas economically stranded. A policy is proposed to aid farmers who wish to stay in farming, and to aid those who want to leave, through job retraining and community assistance.

**81-0657.** Maxwell, J. C., Jr. *The Maxwell Cigar Report: Still in a Tailspin*. *Tobacco International* 182(23): 7, 9, November 14, 1980.

This report details, in tabular form, unit and dollar volume information for the 1978 and 1979 little and large cigar market. Premium cigar sales was the only area which showed expansion, accounting for 3 to 4 percent of industry unit volume and for 16 to 18 percent of dollar volume. A new mild and low-aroma cigar introduced last year failed and only two major brands showed any 1979 growth. Total cigar industry sales decreased from 1978 to 1979, from 676 to 661 million dollars. It is stated that the price spread between cigarettes and little cigars might benefit the cigar industry, particularly where cigarette taxes are high and cigar taxes nonexistent.

**81-0658.** Schneider, L. *The Economic Effects of the Ban on Broadcast Cigarette Advertising*. Doctoral Dissertation, University of California, Los Angeles, University Microfilms International 80-16041, 1980, 195 pp.

An alternative explanation not previously mentioned in the literature for the rise in per capita cigarette consumption which followed the imposition of the ban on broadcast cigarette advertising in 1971 is presented. It is shown empirically that the ban led to a decrease in the real wholesale price of cigarettes and thereby an increase in per capita

cigarette consumption. The effect of the ban on the marginal product and level of advertising and their effect on per capita consumption are also examined. It is concluded that the ban led to a decline in the level of advertising, but the effect of the ban on the marginal product of advertising could not be isolated from its effect on the level of advertising. Estimates of the effect of the ban on real advertising expenditures are presented. Several explanations for the rise in per capita consumption after the ban became effective are rejected. The explanation that per capita consumption rose because the negative effect of the antismoking commercials aired between 1968 and 1971 was greater than the positive effect of the broadcast cigarette advertising on per capita consumption is rejected. The explanation that changes in the age distribution of the smoking population, or a growth in female demand, accounted for the increase after the ban is also rejected. A theoretical discussion of the effect of the ban on the marginal product and level of cigarette advertising and the price of cigarettes is presented. The relationship between cigarette advertising and the price of cigarettes is also examined. The effect of the ban on new brand introduction is briefly considered. (Auth. Abs.)

**81-0659.** Tobacco Reporter. *World Cigarette Production: A Slower Rate of Growth*. *Tobacco Reporter* 107(12): 26, 28, December 1980.

World cigarette production is expected to increase 1-1.5 percent during 1980, reaching about 4,350 billion pieces. The rate of increase declined from 1.8 percent in 1979, and 2.1 percent in 1978. In the developed countries, per capita consumption should continue to fall, reflecting antismoking campaigns, stable population growth, higher tobacco taxes, and price inflation. Developing countries are expected to lead in growth of cigarette production, consumption, and imports in 1980 because of expanding populations and increasing buying power. An analysis of cigarette production, consumption, export, and import for 16 countries is provided.

**81-0660.** United States Tobacco Journal. *Gallup Finds Distributors Diversifying*. *United States Tobacco Journal* 208(5): 1, 119, March 6, 1980.

A Gallup poll of tobacco and confectionery distributors, conducted in January 1980, revealed that 53 percent of them have been expanding into new product areas, especially into institutional foods (29 percent), groceries (24 percent), and janitorial supplies (19 percent). Of the distributors, 32 percent indicated that they were now carrying fewer nontobacco and confectionery items than they did 5 years ago.

## LEGISLATION

**81-0661.** Center for Disease Control. *State Legislation on Smoking and Health 1979*. U.S. Department of Health and Human Services, Public Health Service, Center for Disease Control, Bureau of Health Education, HHS Publication No. (CDC) 80-8386, June 1980, 89 pp.

This report is the fifth in a series on State legislative activity on smoking and health, initiated in 1975 by the Bureau of Health Education, to respond to widespread interest in smoking and health legislation on the part of both public and private agencies. In 1979, 49 State legislatures convened, with only the State of Kentucky not convening. Of the 49 States that met, only one (Nevada) did not introduce legislation pertaining to tobacco products and smoking. As of December 31, 1979, 346 bills had been introduced by these 48 States, with 39 bills being passed into law by 25 States. Nationwide, reported legislation is categorized into seven topics: (1) limitations on smoking; (2) commerce; (3) smoking and schools; (4) advertising; (5) sales to or use by minors; (6) insurance; and (7) other legislation that cannot appropriately be included in the other categories.

**81-0662.** U.S. Senate, Ninety-Fifth Congress, Second Session. *Disease Prevention and Health Promotion Act of 1978 (S. 3115)*. Hearings Before the Subcommittee on Health and

Scientific Research of the Committee on Human Resources, May 25, June 7, June 9, 1978, 949 pp.

A bill to establish a comprehensive disease prevention and health promotion program in the United States (S. 3115) and its amendment (S. 3116) which contains provisions for assistance through formula and project grants, and a bill to create programs designed to promote health through smoking deterrence (S. 3118) are introduced and discussed. Health subject topics include nutrition, cosmetics, and regulation of smoking in Federal facilities. As for the latter, it is stated that smokers will be separated from nonsmokers in any restaurant, cafeteria, snackbar, recreation room, or lounge, and that "No Smoking" signs will be conspicuously posted. Section 406 (tax) of S. 3115 amends the Internal Revenue Code of 1954, relating to the rate of tax on cigarettes, to include an increased rate via a health protection tax by toxic units (i.e., tar and nicotine) for every cigarette, regardless of weight or country of origin. Also, it asks that the Federal Trade Commission determine the tar and nicotine content of each import or export cigarette brand, at least once each calendar year. Section 408 includes changes in cigarette pack labeling as concerns tar and nicotine content, and health warnings. Section 409 establishes a program to deter smoking among children and adolescents, the means being biomedical or behavioral research, and community and school-based programs. All related discussion, tables, statements, and published excerpts are included.

## GENERAL

**81-0663.** Bron, E.J.S. *Cigarettepipe With Purifier*. United States Patent No. 4,215,708, August 5, 1980, 4 pp.

A pipe, i.e., a holder, for cigarettes, cigars, and other tobacco articles, is described which has a receiving hollow for the cigarette at one end connected through a smoke channel with a mouthpiece at the other end. An apparatus is fixed in the smoke channel for purifying the smoke. This apparatus comprises a spiral-shaped catalytic afterburner for the smoke which burns the incompletely burnt hydrocarbons and carbon monoxide more completely and substantially reduces the nicotine and tar contents. The afterburner has a catalytic function and comprises an electric incandescent body. (Auth. Abs. Mod.)

**81-0664.** Chapman, S. *A David and Goliath Story: Tobacco Advertising and Self-Regulation in Australia*. *British Medical Journal* 281(6249): 1187-1190, November 1, 1980.

A small group of health workers (MOP UP—Movement Opposed to the Promotion of Unhealthy Products) succeeded in getting the largest tobacco advertising campaign in Australia banned by testing a clause in the advertising industry's voluntary code of self-regulation. The group complained about a series of cigarette advertisements that featured an Australian entertainer who was popular with the young. Though the tobacco company denied the entertainer's major appeal to the young, the chairman of the Advertising Standards Council ruled that the campaign did breach the code. The delay before the complaint was adjudicated—18 months—contrasted with the speed with which a series of antismoking advertisements had been withdrawn after complaints by a tobacco company's advertisers. MOP UP's victory in this case contains several lessons for people interested in restricting the promotional activities of multinational tobacco companies. (Auth. Abs.)

**81-0665.** Davis, R. M. *Smoke-Free Air and Patients' Rights.* *Illinois Medical Journal* 158(1): 36-37, 1980.

It is stated that while State laws protect the rights of nonsmokers in over 30 States by regulating smoking in public places, Illinois is not one of these States. A particular concern is for nonsmokers' rights in hospitals. It is stated that patients have a right to a safe, health-promoting environment, and further, that physicians, medical students, and other hospital personnel must provide such input toward such policy decisions.

**81-0666.** DeBardeleben, M. Z. (Editor). *Dictionary of Tobacco Terminology.* Richmond, Virginia, Philip Morris Inc., 1980, 90 pp.

Definitions from relevant literature, from Philip Morris employees, and from published standards have been collected and compiled in this dictionary. Terms pertinent to cigarette technology and manufacturing are in the majority included here; however, terms relevant for leaf buyers and processors are also included. Sketches and tables from published literature are placed throughout the book.

**81-0667.** Fairweather, F. A. *Release of Carbon Monoxide Yields of UK Cigarettes.* (Letter). *British Medical Journal* 281(6245): 942, October 4, 1980.

In response to letters and papers about the unavailability of data on the carbon monoxide (CO) yields of cigarettes sold in Great Britain, the author provides information that the Laboratory of the Government Chemist obtains such data from cigarette samples drawn for the Health Department's tar and nicotine surveys. These data are available to medical and scientific research personnel, but the identity of individual brands and their CO yields cannot be divulged without Department agreement.

**81-0668.** Gori, G. B. *Observed No-Effect Thresholds and the Definition of Less Hazardous Cigarettes.* *Journal of Environmental Pathology and Toxicology* 3(4): 193-203, March 1980.

Review data are given which imply that a rapid shift in cigarette consumption habits toward the proposed range of critical values (e.g., 65-151 mg tar/day, 4.5-10.5 mg nicotine/day) could reduce the current epidemic proportions of smoking-related diseases to minimal levels in about 10 years.

**81-0669.** Gori, G. B.; Bock, F. G. (Editors). *A Safe Cigarette?* Banbury Report No. 3, Cold Spring Harbor Laboratory, New York, 1980, 371 pp.

This book contains the proceedings of the Banbury Conference on Less Hazardous Cigarettes. It summarizes what is known about the degree to which hazards of smoking have

been reduced. Evidence was presented to support the further promotion of less hazardous cigarettes as a major public health endeavor. The major alternative to such promotion has been the smoking and health education effort over the last 20 years. The impact of this latter effort appears mild in the United States where consumption per resident has stabilized at about 4,000 cigarettes per year—and consumption per smoker has continued to rise to some 12,000 cigarettes per year. In contrast, a dramatic development in cigarette smoking has been the reduction of sales-weighted averages of tar and nicotine delivery per cigarette to about half the values of just 15 years ago. This trend is expected to accelerate during the next few years. It is concluded from many epidemiological studies that users of low-tar, low-nicotine cigarettes (usually filtered) show a reduced risk of disease roughly proportional to their reduced smoke intake. Early studies in England show an actual reduction of lung cancer rates, and in this country significant reductions in the incidence of cardiovascular diseases and respiratory illnesses have been noted. A noticeable change has been observed in the still positive lung cancer rates in young age groups, at least for males. Also, among the topics discussed at the conference were epidemiologic trends, toxicological dimensions, risk reduction achievements, and cigarette engineering.

**81-0670.** Grunberg, N. E. *The Effects of Nicotine on Food Consumption and Taste Preferences.* Doctoral Dissertation, Columbia University, University Microfilms International 80-16956, 1980, 121 pp.

Habitual cigarette smokers generally have lower body weights than comparably aged nonsmokers. In addition, habitual smokers who abstain from smoking often increase in body weight. This study examined the effects of cigarette smoking and abstinence from smoking on food consumption and taste preferences of humans. In addition, the effects of nicotine administration and cessation of nicotine on body weight, food consumption, taste preferences, and activity were examined in rats. The human experiment was conducted in the framework of a taste judgment study. Subjects were required to taste three sweet, three salty, and three bland foods. After rating these foods on taste dimension scales, the subjects could eat as much as they liked of whatever they wanted. Three experimental groups were included in the study: nonsmokers, smokers allowed to smoke, and smokers not allowed to smoke. Nonsmokers ate significantly more sweets than did smokers allowed to smoke ( $p < 0.01$ ) and somewhat more sweets than smokers not smoking ( $p < 0.10$ ). Consumption of nonsweet foods did not differ between groups. In the animal study, nicotine administration decreased body weight or retarded the normal body weight increase. Cessation of nicotine was accompanied by marked increases in body weight. Similar to the results of the human study, animals receiving large daily doses of nicotine decreased their consumption of very sweet foods. These changes in taste preference resulted in changes in caloric intake that paralleled the body weight changes. The effects of nicotine on body weight could not be explained by changes in total food

consumption or activity. After cessation of nicotine administration, the animals receiving the highest dose of nicotine increased their consumption of very sweet foods. It appears that changes in body weight which accompany cigarette smoking and abstinence from smoking may result from changes in taste preferences and consumption of sweet-tasting foods. (Auth. Abs. Mod.)

**81-0671.** Keith, R. E.; Driskell, J. A. **Effects of Chronic Cigarette Smoking on Vitamin C Status, Lung Function, and Resting and Exercise Cardiovascular Metabolism in Humans.** *Nutrition Reports International* 21(6): 907-912, June 1980.

Cigarette smoking and nonsmoking (12 vs. 10, respectively) healthy male volunteers (25-38 years of age) were studied while at rest, and during and after various lung function and treadmill exercise tests. Both groups were similar in height, weight, age, and body surface area. Plasma vitamin C levels were significantly lower ( $p < 0.05$ ) for smokers although ascorbic acid intakes for the two groups were not significantly different. Resting heart rates were somewhat higher for the smoking group. Lung function tests revealed that smokers had slightly lower 1-sec forced expiratory volumes ( $FEV_1$ ) and slightly higher forced vital capacities (FVC). The  $FEV_1/FVC$  ratio was significantly lower ( $p < 0.05$ ) for smokers. Treadmill workload was significantly greater ( $p < 0.05$ ) for nonsmokers while no differences between groups were seen for oxygen consumption, minute ventilation, resting, and post-exercise blood pressure, as well as post-exercise blood lactic acid levels. Plasma vitamin C levels, lung function, and resting and exercise metabolism seemed to be somewhat impaired in an otherwise healthy group of smokers as compared to nonsmokers. (Auth. Abs.)

**81-0672.** Morris, L. A.; Mazis, M. B.; Barofsky, I. (Editors). **Product Labeling and Health Risks.** Banbury Report No. 6, Cold Spring Harbor Laboratory, 1980, 341 pp.

This volume contains the proceedings of a meeting held May 21-23, 1980, on the efficacy of labeling products to help the public avoid health risks. The four sessions were titled labeling case studies, labeling as a communication device, labeling alcohol bottles with pregnancy warnings, and labeling as social policy. One paper presented as a labeling case study in the first session is concerned with cigarette warning labels. The paper summarizes the results of a Federal Trade Commission staff report which examined the nature and the extent of consumer reactions to this cigarette health information. Among the factors considered are cigarette prices and sales, start of smoking rates, and quit rates. The second session includes papers on the communication-persuasion model and information processing. The third session is in a discussion format. The fourth session (social policy) covers consumer preferences, producer perspectives, cost benefit analysis of label information, and psychosocial consequences of product labels.

**81-0673.** O'Rourke, T. W. **Methodological Considerations to Improve Anti-Smoking Research.** *Journal of Drug Education* 10(2): 159-171, 1980.

One of the most extensively studied areas of health behavior is that related to smoking. However, significant methodological limitations often limit the usefulness of research efforts. The purpose of this paper is to identify several of the more significant limitations found in the present research and to present suggestions to improve further research in smoking behavior. Several significant limitations of smoking research include the lack of common definitions of various behaviors, honesty of subject response, the lack of prospective studies and the problems inherent in such a design, and the preponderance of univariate types of analyses. Also, evaluation of program effectiveness is often limited by lack of appropriate criteria of what is meant by "success." Lastly, much of the current research appears to focus on cessation or modification of the smoking habit. Less emphasis is directed at the area of prevention, especially involving an educational approach. Suggestions for improving antismoking research efforts are presented. (Auth. Abs.)

**81-0674.** Robbins, A. **Adverse Health Effects of Smoking and the Occupational Environment.** *Veterinary and Human Toxicology* 21(5): 367-370, October 1979.

The chapter on occupational exposure found in the 1979 Surgeon General's Report is summarized and six examples of smoking and occupational exposure interactions are listed. Recommendations of the National Institute for Occupational Safety and Health are clarified and include curtailment of tobacco products in the workplace with simultaneous control of work exposure to physical and chemical agents. Future research considerations are also suggested.

**81-0675.** Schoenborn, C. A.; Danchik, K. M. **Health Practices Among Adults: United States, 1977.** U.S. Department of Health and Human Services, National Center for Health Statistics, *Advancedata*, Publication No. 64, November 4, 1980, 10 pp.

This report presents data from the 1977 National Health Interview Survey on the prevalence of seven health practices pertaining to hours of sleep, eating breakfast, eating snacks, physical activity, alcohol consumption, smoking, and weight. Information is provided on the health practices of persons 20 years of age and over, by sex, race or ethnicity, age, income, and education. In 1977, about 36 percent of adults currently smoked cigarettes, about 20 percent had smoked at least 100 cigarettes in their lifetimes but were not currently smoking, and about 44 percent had never smoked. Men were more likely to currently be smoking than were women (40.9 percent and 32.1 percent, respectively), and were more likely to have quit than women (28.2 and 13.5 percent, respectively). A greater percentage of blacks than whites or Hispanics were current smokers (42.0, 35.2, and 33.5 percent, respectively),

but more whites than blacks or Hispanics were former smokers (21.7, 13.0, and 12.3 percent, respectively). In terms of the number of cigarettes smoked/day, whites were found to be heavier smokers than the other two groups. For example, 29.8 percent of the white respondents smoked  $\geq 25$  cigarettes/day compared to 13.6 percent of the Hispanics and 10 percent of the blacks.

**81-0676.** Tabatznik, R. A.; Reiner, S. H. **Smoking Device.** United States Patent No. 4,219,032, August 26, 1980, 5 pp.

This invention pertains to the development of a novel pipe of the water-cooled variety which effects extraction of a smoke component from a smokeable substance without directly igniting the smokeable substance. The smokeable substance itself may comprise tobacco or any other smokeable material. In the case of tobacco, the smoke components are those that give tobacco its characteristic taste and aroma. In this invention a housing is placed, preferably in the shape of a miniature pot, above a conventional bowl in which the smokeable substance is disposed. The bottom of the housing is perforated to accommodate the passage of hot gases from the housing to the bowl. The bowl communicates with a liquid reservoir through a suitable conduit and a stem communicates with the liquid reservoir above the water line for drawing smoke from the bowl through the reservoir and into the user's mouth. In use, a suitable heat source, preferably a combustible substance such as a suitable quantity of charcoal, is disposed in the housing and ignited. The housing is thereafter secured to the bowl. When the user inhales through the stem, hot combustion gases from the burning charcoal are drawn down into the bowl via the perforations in the housing. The hot combustion gases extract smoke components from the smokeable substance, without, however, completely decomposing the smokeable substance into ash as occurs in direct ignition pipes. As a result, the extracted smoke components are cooler than in a direct ignition pipe and the quantity of suspected carcinogens extracted from the smokeable substance is believed to be reduced or even eliminated.

**81-0677.** Thomas, E. G. **Committee of 500 Report: Smoking in the Office: A Burning Issue.** *Management World* 9(4): 11-12, 40, April 1980.

A survey was sent to the Administrative Management Society's Committee of 500 survey group on the issue of smoking in the office. Responses were received from 302 companies. Nearly half of the firms felt that the smoking/no smoking issue was a minor problem; only 15.6 percent of the firms have formulated an official policy regarding the rights of smokers and nonsmokers. Most of the companies having an official policy forbid smoking by employees in certain designated office areas (most often the public contact or reception area). More than a third of the firms without an official policy reported receiving complaints from nonsmokers about the smoking habits of coworkers. A majority of the

companies (62.4 percent) indicated that they would attempt to negotiate a compromise between the workers if a dispute over smoking arose.

**81-0678.** Tobacco International. **Plans Treated to More Anti-Smoking Hijinks.** *Tobacco International* 182(21): 53, 55, October 24, 1980.

Finnish cigarette manufacturers are reformulating their blends in order to enable them to label their products as "harmful" rather than as "extremely harmful." The two labels reflect specific ranges of tar and nicotine content as required by government regulations which become effective in 1981. Although the government imposed a ban on tobacco advertising in 1977, in alerting the public to the new label laws, it is in effect urging them to smoke low-tar products.

**81-0679.** U.S. Department of Health, Education, and Welfare. **Disease Prevention and Health Promotion: Federal Programs and Prospects. Report of the Departmental Task Force on Prevention.** U.S. Department of Health, Education, and Welfare, Public Health Service, Office of the Assistant Secretary for Health, DHEW (PHS) Publication No. 79-55071B, September 1978, 207 pp.

A task force composed of representatives of all agencies within the Department of Health, Education, and Welfare (HEW) was convened in December 1977 to review and analyze departmental activities in disease prevention and health promotion. This report documents the work of the task force, establishes health status goals, and recommends a set of strategies for the Department to employ in expanding and strengthening disease prevention and health promotion activities. Current HEW activities, Federal prevention activities outside HEW, and prevention priorities are discussed. Among the priority problem areas identified by the task force was smoking and health. Health outcomes associated with reduction of smoking, such as lowering the incidence of coronary disease, are identified. A recommended program is outlined which includes an information campaign on smoking and health, expanded research, special education programs, and stronger antismoking regulations.

**81-0680.** Whelan, E. M. **Tobacco and Editorial Policy.** (Letter). *Journal of the American Medical Association* 244(18): 2045, November 7, 1980.

Because of their dependence on income from cigarette advertisements, many popular magazines downplay the impact tobacco has on health. Commenting on an article (*Journal of the American Medical Association* 243(8): 739-740, February 22-29, 1980) on the marketing of the number one preventable cause of human cancer, the author points out that a review of a number of major women's magazines showed not one important story on tobacco and health. Personal



experience with the problem of editorial suppression of tobacco stories is discussed. See also 80-1562.

**81-0681.** Williams, S. **Smoking Device.** United States Patent No. 4,211,244, July 8, 1980, 6 pp.

The primary purpose of this invention is to provide a smoking appliance which permits the user to periodically withdraw or inhale the smoke of a lighted product at some time after the smoke has been received within the appliance. Also, by providing a chamber for receiving and retaining the smoke, the amount of smoke dissipated into the air is significantly reduced. In addition, this invention provides a smoking device for a concentrated or less air-diluted quantity of smoke.

**81-0682.** Wunsche, A. E. **Anti-Pollution Combustion Device.** United States Patent No. 4,210,160, July 1, 1980, 6 pp.

An anti-pollution combustion device for pipes has a bowl in the interior of which is located, above the connection between the bowl and stem, a perforated metal disc on which the tobacco rests. The outside of the bowl is formed with circumferentially extending cooling ribs. The inside of the bowl is lined with a material such as magnesite, dolomite, kaolin, sodium silicate, or feldspar, which prevents the wood of the bowl from charring. In the smoke passage of the stem is incorporated a natural fiber filter such as cotton which can be changed when it is saturated with contaminants. Near the rear end of the stem there is provided a trap with a reservoir in which liquid is trapped and accumulated so that from time to time it can be discharged from the reservoir. The rear end of the stem is provided with a mouthpiece having an annular member projecting transversely of the elongation of the stem and large enough to securely retain the mouthpiece between the teeth of a user, even if the user should have false teeth. A tubular insert may be held in the bowl by the anticharring compound and serves to prevent overheating of the bowl, promotes combustion and further protects the bowl against charring. The metal disc may rest on a flange at the lower end of the insert or it may be of one piece with the same in form of a transverse wall. (Auth. Abs. Mod.)

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\*Individual has contributed to this reference but is not listed as part of the main citation.

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